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AEROSPACE MEDICINE

LACTOBACTERIA AND PROPHYLAXIS IN SPACE

Tartu TASS in English 11 Mar 86

[Article by I. Ivanov, TASS correspondent]

[Text] Cosmonauts on long space missions, even those lasting for many months, will face no health hazards in the form of pathogenic microbes because they are soon going to have a new preparation now being developed at the Microbiology Chair of Tartu University. This preparation is made out of lactobacteria existing in man's body. They increase the body's resistance to disease and kill agents responsible for many diseases.

A group of scientists with Professor Akio Lentsner at the head, have discovered the capacity of lactobacteria to stick to the cells of the human body and thus make them invulnerable to pathogenic microbes.

A researcher observing this process through a microscope sees the light-blue elongated lactobacteria cell--the size of five microns, magnified thousands of times--gradually envelop the surface of the erythrocyte red corpusle. Agents of various diseases, attacking the erythrocyte, can no longer unite with it. They grow sluggish after touching this "tandem" and eventually die.

Professor Lentsner has established, as a result of research in the course of almost twenty years, that during space flights, as well as in different extreme situations (for instance, when mountain climbers scale summits), the number of lactobacteria in man's body decreases considerably and so does its resistance to various disease agents.

Although the crew cabins aboard spacecraft have practically sterile conditions inside, normally-harmless microorganisms may acquire malignant properties in a biologically-closed space. On the other hand, if the crew consists of several members, bacteria existing in the body of one cosmonaut and absolutely harmless to him, may prove fatal for another.

Akio Lentsner says the new preparation will replenish the loss of lactobacteria in man's body and stimulate his immune system. These microorganisms will become an ecological barrier protecting man.

/12955

CSO: 1840/441-F

COMMENTARY ON RESULTS OF BIOLOGICAL SATELLITE PROGRAM

Moscow MEDITSINSKAYA GAZETA in Russian 15 Jan 86 p 4

[Article by Yu. Fabbishenko]

[Abstract] The article reports on the program of research with biological Earth satellites which is pursued by the USSR Ministry of Health's Institute of Medical-Biological Problems. Personnel of this institute are quoted in regard to the results of the seven-day flight of the satellite "Kosmos-1667", which ended on July 17, 1985.* This satellite carried two monkeys and other biological specimens.

Academician O. G. Gazenko, director of the institute, explained that experimental animals are employed in such missions for the purpose of gathering objective scientific data which, by its nature, is difficult or impossible to obtain from human subjects. The system for preventing adverse effects of weightlessness on cosmonauts makes it impossible to obtain precise information in some cases, for example. Moreover, a cosmonaut's sense of duty may prompt him to conceal symptoms of pain or illness, whereas an experimental animal will not do this. Gazenko mentioned that the condition of the two monkeys on board "Kosmos-1664" was monitored with the aid of 20 sensors attached to each animal, a number that could not be used on a cosmonaut. The initial stage of preparation of the monkeys for the experiment took place at a nursery of the USSR Academy of Medical Sciences' Institute of Experimental Pathology and Therapy, whose director is B. A. Lapin, member of the academy. This nursery is located in Sukhumi.

All associates of the medical-biological institute who took part in the space experiment reportedly were pleased with the results. It is said that the experiment helped the researchers to learn more about the mechanism of changes in an organism during the acute period of adaptation. Doctor of Medical Sciences Ye. A. Ilin commented on examinations of the subjects and on control experiments which have been performed since the completion of the mission.

FTD/SNAP
/12955
CSO: 1840/383

*See the Daily SNAP, August 1, 1985, p 2, col. 1

UDC 575.245:633.111

PROTEIN CONTENT AND AMINO ACID COMPOSITION IN GRAIN OF INDUCED DENSE EAR AND SPHEROCOCCOIDAL MUTANTS OF COMMON WHEAT

Moscow GENETIKA in Russian Vol 21, No 5, May 85 (manuscript received 15 Jun 84, after final revision, 22 Sep 84) pp 828-838

[Article by T. V. Salnikova, A. V. Bobrova, O. I. Dosmaylova, N. F. Amelkina, T. A. Ketova, T. M. Valeyeva, S. S. Degtyareva and V. V. Zazimko, Institute of Chemical Physics, USSR Academy of Sciences, Moscow, Moscow Agriculture Academy imeni K. A. Timiryayev]

[Abstract] Protein and amino acid composition of the macromutants of common wheat (dense ear and spherococcoidal) induced in Belotserkovnaya 198 wheat by chemical mutants N-nitrosoalkyl- and N-nitrosodialkylurea was studied. An attempt was made to discover morphologic markers for high protein grain. Results were reported of a four-year study of 13 dense ear and 11 spherococcoidal mutant lines. Most of them showed lower protein content than the starting grain; only two dense ear and four spherococcoidal lines were isolated with negligible increase in protein content (2.0 and 2.5%). A number of correlations between amino acid and protein content of various mutants was reported. In general, the spherococcoidal mutants were poorer in essential aminoacids. A conclusion was reached that both of the lines studied could be used for hybridization of wheat with improved quality of grain: the spherococcoidal mutants as donors of high protein content and the dense ear mutants as high amino acid donors. Figures 5; references 22: 9 Russian, 13 Western.

7813/12955
CSO: 1840/377

UDC 582.28:577.152

CONDITIONS OF BIOTRANSFORMATION OF STRAW INTO PROTEIN PRODUCT BY MYCELIAL FUNGI

Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 19, No 1, Jan-Feb 85
(manuscript received 23 Mar 83) pp 32-36

[Article by V. G. Babitskaya and I. V. Stakheyev, Institute of Microbiology, Belorussian SSR Academy of Sciences, Minsk]

[Abstract] A study is presented of the conditions of biotransformation of straw into a protein product with elevated concentration of substrate in the nutrient medium. Wheat straw was ground to particle size 0.1-0.5 cm and introduced in a quantity of 1.5% into a medium of 0.5% NH_4NO_3 , 0.1% KH_2PO_4 and 0.05% $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ with 0.5% corn extract. The fungi *Penicillium verruculosum* and *Chaetomium cellulolyticum* were cultivated in Erlenmeyer flasks at 28°C with agitation and aeration. The *Ch. cellulolyticum* culture produced protein more rapidly than the *P. verruculosum* culture, the maximum protein concentration being reached in a medium with 0.5% corn flour or 0.5% beet pulp in 42 hours. 300 g straw and 50 g additional nutrient source produced 200-230 g straw products containing 20.2 and 20.4% protein. The protein products produced with *P. verruculosum* with increased straw content can be used as additives for agricultural feeds. Toxicologic studies using paramecia and rabbits revealed no harmful effect. Figures 3; references 7: 4 Russian, 3 Western.

6508/12955
CSO: 1840/1029

UDC 632.4:632.938:633.11:582.285.2

USE OF MATHEMATICAL MODELS IN STUDY OF WHEAT RESISTANCE TO STEM RUST

Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 19, No 1, Jan-Feb 85
(manuscript received 26 Apr 83) pp 61-66

[Article by L. A. Kashemirova, G. G. Filippova, S. S. Sanin, Yu. A. Strizhekozin and A. A. Agayev]

[Abstract] An attempt was made to develop a mathematical model to allow the results of laboratory testing of certain wheat stem rust pathogen aggressiveness indicators to be used to predict losses in the grain harvest for various varieties of wheat under field conditions. Special experiments compared various methods and conditions of cultivation of the plants in greenhouses and laboratory artificial climate chambers. The studies showed that the coefficient of infection on plants does not provide sufficient stability of results produced even when restricted to a single variety, a single race of pathogen, and comparable temperature and light conditions. Repeat experiments showed infection factor variations by factors of 1.5-2. When isolated leaves were cultivated and strictly fixed conditions and methodological approaches maintained, good reproducibility was achieved. This allowed selection of characteristics to be used in subsequent studies, including intensity of spore formation, infection factor, plant reaction type, and pathogen race. Empirical equations were derived which, in combination with methods of estimating the relative tolerance factor of a variety, can achieve satisfactory accuracy in calculating expected grain harvest losses in the field. Figures 4; references 16: 1 Russian, 15 Western.

6508/12955
CSO: 1840/1029

UDC 632.4:582.285.2:633.1

STUDY OF BROWN RUST PATHOGEN POPULATION STRUCTURE IN CEREALS BASED ON THEIR COMPOSITION IN AIR SAMPLES

Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 19, No 1, Jan-Feb 85
(manuscript received 6 Dec 83) pp 66-70

[Article by S. S. Sanin, V. P. Chuprina, L. T. Babayants, I. I. Dukhanin, L. A. Kashemirova and A. N. Slyusarenko]

[Abstract] Studies were performed in order to determine the possibility of analyzing the structure of a population of brown rust pathogens as well as their migrating capability with respect to individual species in air samples taken from the boundary layer of the atmosphere with an aircraft-mounted impact sampling device. Plant leaves were exposed in the impacter, sprayed with distilled water, and placed in a moist chamber at 15 2°C air temperature for 14 hours, then in an artificial climate chamber until three days after symptoms appear, at which time the reaction type and degree of development of the disease were determined. Flights were conducted at 5-50 m altitude on clear sunny days with intensive convection. The method of biological testing of air samples for serial brown rust pathogens allowed timely and accurate estimation of the infectious capacity, species membership, virulence, race and biotype composition. This method can be used to study the migration capacity of the fungi, determine their population structure and predict the development of outbreaks of the disease. References 13: 4 Russian, 9 Western.

6508/12955
CSO: 1840/1029

UDC 633.11.631.524.85

FROST AND DROUGHT RESISTANCE OF WINTER-SPRING HYBRID SOFT WHEAT

Moscow SELSKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 11, Nov 85
(manuscript received 25 Jun 85) pp 80-85

[Article by A. K. Lyashok and V. N. Musich, All-Union Selection-Genetic Institute, Odessa]

[Abstract] This work continues studies of the contribution of each component in a hybrid of winter and spring soft wheat to the level of cold and drought resistance of the winter-spring hybrids produced. The influence of growing temperature of F_1 and F_2 hybrids on the degree of cold resistance of winter wheat and drought resistance of spring forms in subsequent generations was also studied. The studies were performed under artificial climate conditions, using winter wheat varieties with good cold resistance, hybridized by reciprocal crossing with spring wheat varieties differing in reaction to length of day and genes controlling developmental type. Cold resistance was determined by freezing the plants in rolls at -13°C . Drought resistance was studied by a biophysical method. The experimental data indicated that the level of cold resistance depends not only on resistance of the winter component to cold, but particularly the resistance of the parent spring variety, which in turn depends on a number of dominant alleles responsible for development type. The maximum cold resistance was obtained from winter forms produced by crossing winter varieties with spring varieties which were sensitive to length of day. References 19 (Russian).

6508/12955
CSO: 1840/1030

UDC 636.2[636.082.2+61-08

USE OF MICROCOMPUTERS IN SELECTIVE BREEDING OF CATTLE

Moscow SELSKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 11, Nov 85 (manuscript received 11 Mar 85) pp 118-125

[Article by N. G. Bukarov and N. D. Kiselev, All-Union Scientific Research Institute of Animal Husbandry, Dubrovitsy, Moscow Oblast]

[Abstract] The task of this study was to develop and test a system of software for selective breeding of cattle for the "Elektronika-BZ-21" microcomputer. Purposes of the software were: 1- to determine the genetic similarity between groups of animals based on biological markets; 2 - evaluate productivity of cows; 3 - evaluate bulls based on milk productivity of daughters. The programs developed can be used to calculate a breeding value index for milk cows and bulls. Programmable calculators or microcomputers can be successfully used to introduce modern immunogenetic (biochemical) and index methods of breeding evaluation of cattle, which should facilitate an improvement in economic effectiveness of breeding of milk cattle.

6508/12955
CSO: 1840/1030

UDC 626.8:631.4

APPLICATION OF POST-HARVEST RESIDUES AIMED AT INCREASING YIELD OF RICE ON
AMELIORATED ALKALINE SOILS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA in Russian No 1,
Jan-Feb 86 (manuscript 22 Apr 85) pp 43-57

[Article by S. N. Nelidov, L. V. Vasilyeva and Ye. N. Mishustin, Institute
of Soil Cultivation, KaSSR Academy of Sciences, Alma-Ata and Institute of
Microbiology, USSR Academy of Sciences, Moscow]

[Abstract] Recent expansion of the acreage for planting rice in Kazakhstan
and other Central Asian Republics is the result of cultivation of argilla-
ceous deserts on alluvial plains which consist of very poor soil for agricul-
tural utilization because of being salty, alkaline and non-fertile. Rice
does not grow well at pH above 9.0. It was shown that spring tillage with
rice straw composted under anaerobic conditions gave excellent results in
stimulating rice growth on such soils. Compost stimulated activity of soil
microorganisms, increased nonsymbiotic nitrogen fixation, neutralized alkaline
reaction of the soil and improved supply of nutrients to the plants. Rational
utilization of post-harvest residues of rice as meliorative fertilization
was shown to be an effective way to increase productivity and fertility of
alkaline soils while decreasing production costs of rice. Figures 5;
references 31: 30 Russian, 1 Western.

7813/12955
CSO: 1840/378

UDC 632.754.1:633.11"321"

PHENOLOGY AND SPRING WHEAT DAMAGE BY EURYGASTER INTEGRICEPS PUT. (HETEROPTERA,
SCUTELLERIDAE)

Leningrad ENTOMOLOGICHESKOYE OBOZRENIYE in Russian Vol 64, No 4, Oct-Dec 85
(manuscript received 25 May 83) pp 665-668

[Article by N. A. Yemelyanov, Saratov Agricultural Institute]

[Abstract] An analysis was conducted on the correlation between larval stage and spring wheat damage in a system employing Saratov 36 and 42 wheats infested with the Sunn pest, *Eurygaster integriceps*. Regression analyses demonstrated a direct correlation between larval stage and coefficient of grain damage, ranging from 18.2% damage coefficient for stage 2 pest to 41.7% for stage 5. However, with an increase in the damage coefficient from ca. 10 to 40% the negative effects on the quality of gluten diminish. This phenomenon was ascribed to the fact that in certain regions, such as Western Kazakhstan, development of the pest precedes that of the wheat crop and intensifies grain damage. Because of the reduction in flour production from such grain, the negative effects on the quality of gluten are minimized. Figures 1; references 20 (Russian).

12172/12955
CSO: 1840/403

UDC 631.46

BIOLOGICAL ACTIVITY AND MINERALIZATION OF ORGANIC MATTER IN SANDY PEAT SOILS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA in Russian No 1, Jan-Feb 86 (manuscript received 28 Jun 83) pp 58-64

[Article by T. G. Zimenko, V. I. Belkovskiy, N. N. Bambalov, N. V. Gavrilkina and V. V. Smirnova, Institute of Microbiology, BSSR Academy of Sciences; Belorussian Scientific Research Institute of Development and Water Resources, Peat Institute, BSSR Academy of Sciences, Minsk]

[Abstract] Dried peat soil is used very effectively in BSSR agriculture. However, it constantly undergoes undesirable changes, the most dangerous of which is rapid mineralization of its organic component by the microbial-biochemical route. Additional losses result from wind and water erosion. Mixing peat with sand is an effective method for increasing its fertility as it increases the water temperature and nutritional conditions of the soil. Therefore the effect of "sanding" on microbial-biochemical activity of peat soil was studied along with the accompanying mineralization of the organic matter in peat. It was shown that mixing the surface layer of peat soil with sand (400 m³/hectare) increases its biogenic character and intensifies mineralization. Sand did not affect the microflora of the soil. To slow down these processes a top layer of pure sand should be applied to serve as a mineral screen. Deep meliorative tilling results in formation of an organic mineral layer with high biological activity and fertility. Mixing peat sediment into soil profile slows down its biological mineralization. Figure 1; references: 14 Russian.

7813/12955
CSO: 1840/378

UDC 633.16:631.527:575

MORPHOGENESIS IN HYBRIDS RESULTING FROM CROSSING DISTICHOUS AND POLYSTICHOUS BARLEY VARIETIES

Baku IZVESTIYA AKADEMII NAUK AZERBAYDZHANSKOY SSR: SERIYA BIOLOGICHESKIKH NAUK in Russian No 4, Jul-Aug 85, pp 84-90

[Article by A. V. Ali-Zade and E. D. Abbasov, Institute of Genetics and Breeding, Azerbaijan SSR Academy of Sciences]

[Abstract] Studies were conducted on form formation in barley hybrids obtained by crossing distichous and polystichous varieties. Analysis of the results of a series of crossings showed segmentation in F_2 generation of the spikes into distochous, polystichous and intermediate forms. The fraction of plants in each group varied in relation to the parental varieties, with the incidence of distichous F_2 progeny ranging from 41.2 to 75.3%, of polystichous progeny from 9.9 to 32.9%, and of the intermediate forms from 7.9 to 41.2%. The F_2 generation also displayed variety in terms of spike length and density, grain size, awn characteristics, etc. Crossing of distichous and polystichous barleys represents a viable approach to securing new, valuable varieties of barley with desired characteristics. Figures 7; references 8: 1 Chinese (in English), 5 Russian, 1 Western.

12172/12955
CSO: 1840/396

UDC 633:11:631.523:575

ENVIRONMENTAL AND TRANSGRESSIVE VARIATION OF ECONOMICALLY IMPORTANT TRAITS
OF SOFT WHEAT

Baku IZVESTIYA AKADEMII NAUK AZERBAYDZHANSKOY SSR: SERIYA BIOLOGICHESKIKH
NAUK in Russian No 4, Jul-Aug 85, pp 77-83

[Article by I. D. Mustafayev, V. V. Figarova and R. G. Dzhafarova, Institute
of Genetics and Breeding, Azerbaijan SSR Academy of Sciences]

[Abstract] An analysis was conducted on environmental and transgressive variation of selected economically-important traits of a variety of soft wheats from different countries and 28 hybrids cultivated under the conditions prevalent in Apsheron in 1982-1984. Statistical analyses demonstrated that the spectrum of variation in the hybrids was much more extensive than in the parental and F_1 plants. The greater variability in the F_2 generation was evidently due not only to environmental factors, but predominantly to genetic segregation yielding progeny with variable quantitative manifestations of the traits of interest, including evidence of transgression. The value of hybrids lies in transgressive variation, with breeding for transgressants in the progeny of the hybrids depending on the extent and frequency of transgression. Effectiveness of breeding is considerably facilitated if emphasis is placed on the grain weight and count of the main spike, rather than the count and weight of grain per plant. References 14: 12 Russian, 2 Western.

12172/12955
CSO: 1840/396

UDC 541.183:577.15.152

EFFECT OF VARIOUS FACTORS ON STABILITY OF ALCOHOL DEHYDROGENASE

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 12, Dec 85
(manuscript received 20 Mar 84) pp 3031-3035

[Article by Z. V. Mikelsone, A. N. Mitrofanova and A. L. Nikolayev, Faculty of Chemistry, Moscow State University imeni M. V. Lomonosov]

[Abstract] Inactivation of alcohol dehydrogenase (AlDase) in adsorption layers is a complex process subject to effect of the carrier on protein globule conformation and to oxidation of SH-groups. This process was studied at constant temperature with surfaces obtained by modification of silica gel with lipids and serum albumin; the effect of nicotinamide adenine dinucleotide (NAD^+) and glutaraldehyde and stability of the adsorbed enzyme were also investigated. It was shown that the weakest stabilizing action on inactivation of AlDase was exhibited by silica gel modified with cholesterol, the strongest effect was shown by the albumin treated silica surface. This is probably due to its ability to form a protein hydrophobic microenvironment around the globules which stabilizes their structure and slows down the effect of the denaturing factors of the external medium. Another possible factor is its ability to bind heavy metal ions which could participate in oxidative deactivation of the enzyme. Combination of both factors is also possible. In solution, the stability of enzyme increased with increasing concentration of NAD^+ up to $6 \cdot 10^{-4}\text{M}$; further increase in its concentration led to a drop in AlDase stability. In contrast, NAD^+ had a destabilizing effect on this enzyme adsorbed on the surface of silica gel; glutaraldehyde showed no effect on the stability. Figures 5; references 7: 3 Russian, 4 Western.

7813/12955
CSO: 1840/371

UDC 773:577.152

MODELLING OF IMAGE DEVELOPMENT STAGE IN ENZYME SYSTEMS OF LIGHT SIGNAL
REGISTRY. RESOLUTION POWER

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA: SERIYA 2, KHIMIYA in Russian
Vol 26, No 6, Nov-Dec 85 (manuscript received 17 Jul 84) pp 598-603

[Article by S. B. Pozharskiy, M. S. Safonov, M. A. Manenkova and N. F. Kazanskaya, Department of Chemical Enzymology]

[Abstract] Theoretical modelling of the development process of a hidden image facilitates investigations of the effect of development conditions and other parameters on the visible image obtained. Experimental data for development of such a model were obtained for the development process of a photo image formed by a light-immobilized enzyme (alkaline phosphatase from *E. coli*). The image was obtained by performing hydrolysis of *a*-naphthyl-phosphate with the enzyme immobilized on a matrix. The *a*-naphthol formed reacted with a diazocompound yielding an insoluble, almost black dye. This is one of the most effective reactions in histochemistry occurring very rapidly in presence of a biocatalyst. The dye concentration could be experimentally established as a function of optical density. In silver photography, edge effects may result in apparently stronger darkening of small isolated segments than densities of larger segments; in the enzyme system with decreasing L/l parameter, the edge effect gradually disappears. Figures 4; references 6: 4 Russian, 2 Western.

7813/12955
CSO: 1840/372

UDC 576.851.2.48:577.113.083

CHROMATOGRAPHIC PURIFICATION OF PLASMID DNA

Moscow MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian
No 9, Sep 85 (manuscript received 25 Dec 84) pp 44-47

[Article by G. N. Naumov, Northern Caucasus Branch of All-Union Scientific
Research Institute of Biosynthesis of Proteins, Krasnodar]

[Abstract] Searching for alternative ways of purifying plasmid DNA, the authors turned to chromatography. DNA preparation of plasmid RPl, obtained by alkaline lysis of plasmid-containing cells and precipitated with ethanol or PEG-6000, was purified on a Sephadex 4B column. This carrier does not adsorb DNA and it is eluted from the column in the first peak, albeit contaminated with chromosome DNA fragments. A second purification step separated the cyclic plasmid DNA from linear molecules of chromosomal fragments: at 90°C linear molecules were denatured leaving cyclic plasmid DNA intact. Chromatography on a hydroxyapatite column gave pure plasmid DNA. The entire procedure lasts two days and yields DNA with preserved native structure and biological activity, free of RNA, protein and fragments of chromosomal DNA. The yield of RPl DNA was 70-80 ug/g of wet biomass. Figures 3; references 11: 5 Russian, 6 Western (1 by Russian authors).

7813/12955)
CSO: 1840/376

UDC 581.192.7

ZEATIN-BINDING PROTEINS IN BARLEY LEAVES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 286, No 3, Jan 86
(manuscript received 9 Jul 85) pp 765-768

[Article by G. A. Romanov, V. Ya. Taran and O. N. Kulayeva, Institute of Plant Physiology imeni K. A. Timiryazev, USSR Academy of Sciences, Moscow]

[Abstract] In order to define the mechanism of action of cytokinins, fractionation studies were conducted on barley leaves (*Hordeum vulgare*) to isolate zeatin-binding components and assess the specificity of binding. Radio-ligand binding and inhibition studies led to the identification of a protein fraction precipitable with 40-90% ammonium sulfate that possessed specific binding activity. The K_d for H-trans-zeatin was on the order of 10^{-7} to 10^{-6} M. Unlabeled zeatin as well as other cytokinins (kinetin, isopen-tenyladenine, benzyladenine) were highly and equally effective in competing with radiolabeled zeatin for the binding sites. Agents with weak cytokinin activity were far less effective competitors, and other classes of phyto-hormones were ineffective. Binding activity of the active fraction was abolished by short-term heating at 70°C and markedly reduced by pronase treatment, indicating that the binding sites -- or receptors -- are protein in nature or include protein as a major component. Figures 2; references 7: 2 Russian, 5 Western.

12172/12955
CSO: 1840/364

UDC 576.8.097.3

MONOCLONAL ANTIBODIES TO SMOOTH MUSCLE CELL SURFACE OF HUMAN AORTA

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 286, No 2, Jan 86
(manuscript received 26 Jun 85) pp 437-439

[Article by M. A. Glukhova, A. Ye. Kabakov, O. I. Ornatskaya, N. G. Sepetova, M. D. Frid and V. N. Smirnov, corresponding member of USSR Academy of Sciences, All Union Scientific Cardiology Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] Detailed experimental data are reported for isolating monoclonal antibodies 11G10. By means of indirect immunofluorescence method, it was shown that these antibodies reacted with the surface of smooth muscle and fibroblast surfaces and did not recognize the surface of endothelial cells. The antigen recognized by 11G10 antibodies was identified by means of immunoprecipitation: it is a polypeptide with electrophoretic mobility corresponding to molecular weight of 330,000. It is possible that, in addition to the protein component, this antigen contains a lipid or hydrocarbon portion. Currently, these antibodies are used in model systems for studying the possibilities of direct delivery of materials to muscle cells. Figure 1; references 9 (Western).

7813/12955
CSO: 1840/362

UDC 541.124:542.943.5:[547.466+547.96]

REACTIVITY OF AMINO ACIDS AND PROTEINS IN REACTIONS WITH OZONE

Moscow KINETIKA I KATALIZ in Russian Vol 26, No 6, Nov-Dec 85
(manuscript received 2 Jan 85) pp 1332-1335

[Article by A. V. Ignatenko and S. N. Cherenkevich, Belorussian State University imeni V. I. Lenin, Minsk]

[Abstract] In an attempt to establish principal targets of ozone reactions with biological objects, rate constants of these reactions were determined for the reaction of ozone with amino acids and proteins. Measuring the change in ozone concentration at the outlet from the reactor used for oxidation of aliphatic, aromatic and sulfur containing amino acids showed that a stationary state was reached after a specific time and maintained at that level. In proteins, the amino acids located at the surface of a protein globule were the ones primarily oxidized. Protein oxidation parameters depend on the structure of biopolymers and on the conditions of ozonation. The resistance of amino acids towards ozone increased in the following order: cysteine, met, try, tir, his, cystine, phen, pro, arg, tre, ser, lys, glu-n, asp, glu, asp, leu, val, ala and gly. Figures 3; references 13: 9 Russian, 4 Western.

7813/12955
CSO: 1840/386

UDC 577.354.2

CYCLIC NUCLEOTIDE PHOSPHODIESTERASE IN EXTERNAL SEGMENT PREPARATIONS OF SUSLIK RETINA CONES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 286, No 2, Jan 86
(manuscript received 23 Jul 85) pp 454-457

[Article by N. Ya. Orlov, Ye. V. Kalinin, T. G. Orlova, A. A. Freydin and Corresponding Member of USSR Academy of Sciences G. R. Ivanitskiy, Institute of Biological Physics, USSR Academy of Sciences, Pushchino, Moscow Oblast]

[Abstract] One molecule of bleached rhodopsin activates, in one second, up to 1,000 molecules of cyclic nucleotide phosphodiesterase (PDE) in external segments of vertebrate retina rods (ESR) inducing hydrolysis of about 10^6 cGMP molecules. It was hypothesized that this reaction cascade could represent a channel of information transfer about absorption of a quantum of visible light by external photoreceptor segments. In this paper, a method was reported for production of preparations from external segments of suslik (*Citellus parryi* Rich.) retina photoreceptors, the vast majority of which are cones. (ESC). Data were reported showing that PDE is present in these preparations resembling the PDE ESR of ox and frog retinas. It was concluded that PDE in ESC may play a role in amplification and transformation of visual excitation, analogous to the role of PDE in ESR. Figures 3; references 15: 2 Russian, 13 Western.

7813/12955
CSO: 1840/362

UDC 577.3

DYNAMIC MAPPING OF HEART MAGNETIC FIELD

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 286, No 2, Jan 86 (manuscript received 1 Jul 85) pp 451-454

[Article by A. N. Matlashov, Yu. Ye. Zhuravlev, I. V. Valiyev, Yu. N. Orlov, S. A. Platonov, A. Ya. Lipovich, A. M. Taratorin, E. E. Godik and Yu. V. Gulyayev, Academician; Institute of Radiotechnology and Electronics, USSR Academy of Sciences, Moscow]

[Abstract] Investigations of magnetic fields of biological origin (MFBO) represent a new method of studying processes in living organisms. MFBO result from nonstationary electric currents distributed in tissues which accompany excitation processes of heart, brain and muscle cells. A magneto-metric apparatus was constructed for dynamic mapping of the magnetic field created by the human heart by means of which it is possible to measure the component of magnetic field intensity perpendicular to the chest. Magneto-cardiograms are recorded synchronously with EKG. The use of modern methods for treatment of dynamic images in exposing integral dynamic structure of the magnetic field of the human heart under normal conditions and their characteristic alterations due to pathological changes represents a new potential for functional cardiodiagnosis. Figures 2; references 6: 3 Russian, 3 Western.

7813/12955
CSO: 1840/362

UDC 577.122:547.221

INDUCTION OF HEPATIC MICROSOMAL MONOOXYGENASES BY CHEMICALLY-INERT
FLUOROCARBONS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 286, No 3, Jan 86
(manuscript received 3 Jul 85) pp 729-732

[Article by F. F. Beloyartsev, G. R. Ivanitskiy, corresponding member, USSR Academy of Sciences, Ye. I. Mayevskiy, V. V. Obraztsov and D. G. Shekhtman, Institute of Biological Physics, USSR Academy of Sciences, Pushchino, Moscow Oblast]

[Abstract] In view of the localization of fluorocarbons in the proximity of endoplasmic reticulum in the liver, the latter containing monooxygenases, studies were conducted on Wistar rats to determine whether, in fact, these inert compounds affected the activity of these oxygenases. Intravenous injections of fluorocarbon emulsions (10% v/v of perfluorodecahydronaphthalene, perfluorotripropylamine, perfluoroindane or perfluorodehydronaphthalene) resulted in a markedly enhanced elevation of cytochrome P-450 in the microsomal fraction in a dose-related fashion. Peak elevation was obtained 3 days after injection, with the effect persisting for some 15 days with a 25 ml/kg dose. Densitograms of microsomal peptides revealed changes in 16 and 50 kD polypeptides, concomitant with an increase in the activity in the oxidation of NADP-H and hydroxylation of benz[a]pyrene and p-nitroanisole. In addition, lipid peroxidation showed marked inhibition. These observations indicate that metabolically inert fluorocarbons may possess marked physiological consequences, at least in the case of hepatic monooxygenases. Figures 3; references 14: 4 Russian, 10 Western.

12172/12955
CSO: 1840/364

UDC 557.3.49:546.71

PHOTOCATALYTIC ELECTRON TRANSFER ACROSS STRUCTURAL PROTEIN-BEARING VESICULAR MEMBRANES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 286, No 3, Jan 86
(manuscript received 9 Jul 85) pp 741-745

[Article by L. A. Khmara, A. Ye. Arkhipets and A. I. Kryukov, Institute of Physical Chemistry imeni L. V. Pisarzhevskiy, Ukrainian SSR Academy of Sciences, Kiev]

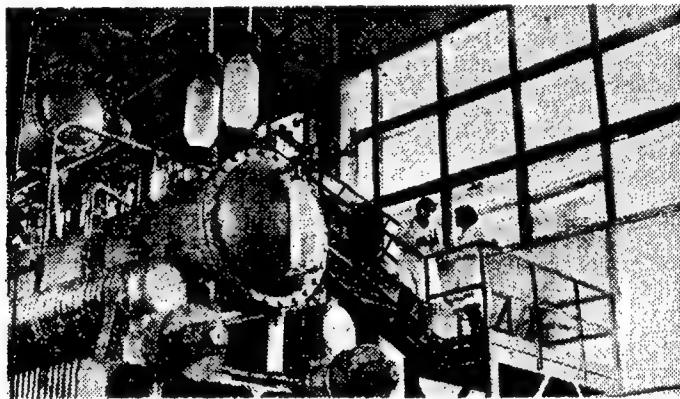
[Abstract] Since structural proteins in thylakoids have been implicated in determining the rate and direction of electron transport processes, the effects of such proteins on electron transfer across phospholipid vesicular membranes were analyzed in a system employing sensitizers. The vesicles were prepared from soybean azolectin and were sensitized either with chlorophyll *a* or Mg-tetra-4-tert-butylphthalocyanine, with the structural proteins incorporated into the membranes derived from *Pisum sativum*. Intravesicular EDTA was employed as the electron donor, and potassium ferricyanide as the acceptor in the external medium. Following illumination with a halogen lamp potentiometric determinations of potassium ferricyanide reflected changes in the redox potential resulting from electron transfer. Incorporation of the structural proteins resulted in an initial inhibition of the rate of electron transfer during illumination, with subsequent restitution of the rate to control levels. The indication that the proteins formed an active complex with the sensitizers was also supported by changes in the electronic spectra of both chlorophyll *a* and the Mg-phthalocyanine, demonstrating thereby that active transport systems can be reconstituted *in vitro*. Figures 2; references 14: 11 Russian, 4 Western.

12172/12955
CSO: 1840/364

BIOTECHNOLOGY

NEW HYDROGEN GENERATOR AT KIROV BIOCHEMICAL PLANT [caption]

Moscow SELSKAYA ZHIZN in Russian 4 Jan 86 p 1

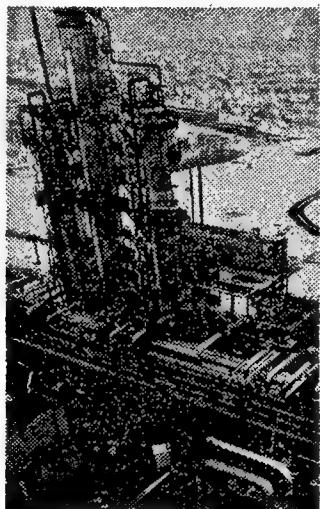


[Text] The Kirov Biochemical Plant is the leading industrial enterprise in the production of fodder yeasts for the agricultural needs of the country. The photograph shows a new hydrogen generator, commissioned according to the plan for industrial development and expansion of the range of manufactured products.

/12955
CSO: 1840/380-P

"PAREKS" COMPLEX FOR LIQUID PARAFFIN PRODUCTION [caption]

Moscow SELSKAYA ZHIZN in Russian 20 Dec 85 p 1



[Text] The "Pareks" complex for paraffin production, scheduled to go on-line in the current Five-Year-Plan, is an integral part of the Novo-Ufimskiy Petroleum Processing Plant. Its products are the raw material for the micro-biological industry, which produces protein-vitamin concentrates and highly efficient animal feed additives. The photograph shows the "Pareks" complex.

/12955
CSO: 1840/380-P

LYSINE-PRODUCING PLANT IN ARMENIA [caption]

Moscow SELSKAYA ZHIZN in Russian 15 Jan 86 p 1



[Text] Microbiological industry is under intensive development in Armenia. In the Charentsavansk industrial enterprise, "Lizin," the production of crystalline lysine is being set up. This preparation is one of the main additives in animal feeds. The photograph shows one of the shops.

/12955
CSO: 1840/380-P

VIRUS PROTECTION FROM DECREASED-COST

Moscow TRUD in Russian 31 Jan 86 p 4

[Article by P. Osminin, Moscow]

[Abstract] Early information about interferon came in research with mice in 1957, when it was determined that mice suffering from prior viral infections were protected from otherwise lethal pathogens. Further research confirmed this effect and eventually identified interferon as an antibody, but donor blood in enormous quantities was required for its production. In recent years genetic engineering has made it possible to produce human protein with a hybrid bacteria. The bacterial biomass makes it possible to produce interferon in only 5-6 hours, using a low-cost medium while saving 40-50 tons of donor blood that would otherwise be required for the same production. Purification problems in isolating interferon have been solved with a special biofilter, so that the author's institute, the All-Union Scientific Research Institute for Genetics and Selection of Production Microorganisms, has produced large quantities of interferon for testing against hepatitis, shingles, keratitis and other ailments. Final testing is currently under way.

12131/12955

CSO: 1840/333

ENVIRONMENT

UDC 502.3.006:658.5

ENVIRONMENTAL PROTECTION

Moscow STANDARTY I KACHESTVO in Russian No 1, Jan 86, p 77

[English synopsis of article in sources]

[Text] Standardization Work in the Field of Environment Protection (Exemplified by the Chlorine Industry). L. N. Budaeva, L. A. Yakovleva and A. L. Momot.--Standarty i kachestvo, 1986, No 1.

The experience of work of a basic organization in standardization in the field of environment protection, the Sterlitamak Office of the State Research and Project Design Institute of Chlorine Industry, in what concerns the development of industry-wide standards on environment protection, is presented.

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/12955

CSO: 1840/348-E

EPIDEMIOLOGY

UDC 616.98:579.834.114]-036.2(575.12/.13)

RELAPSING TICK-BORNE FEVER IN FERGANA OBLAST OF UZBEKISTAN

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 5, Sep-Oct 85 (manuscript received 28 May 84) pp 85-86

[Article by N. Ya. Ustimenko, A. I. Musatova, L. S. Makarova, L. I. Cherneva and N. F. Ofitserova, Fergana Oblast Sanitary-Epidemiologic Station and the Scientific Research Institute of Medical Parasitology imeni L. M. Isayev, Uzbek SSR Ministry of Health, Samarkand]

[Abstract] An outline is presented of epidemiologic studies on tick-borne relapsing fever in the Fergana Oblast of Uzbekistan for the period 1950 to 1983. The marked reduction of cases to 10.4-12.0 in the period 1960-1970 from a high of 198.4 cases/year in the 1950-1959 period was due to intensive public health measures aimed at eradication of the tick vector. In the period 1980-1983 an incidence of 153.2 cases/year was noted, which was in accord with the recovery of the tick population. Peak case loads occurred in May-June and September-October in reflection of the seasonal dynamics of the tick population. These observations indicate that tick-borne relapsing fever remains a problem in the Fergana Oblast that will require further attention from the public health authorities. Figures 1; references 3 (Russian).

12172/12955
CSO: 1840/404

UDC 616.995.132.6-036.22-058(470.62)

TRICHINELLOSIS OUTBREAK IN TUAPSE AND ATTENDANT SOCIOECONOMIC LOSSES

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 5, Sep-Oct 85 (manuscript received 16 Dec 83) pp 61-64

[Article by T. I. Tverdokhlebova, A. A. Kochetkov, I. K. Savelyeva and S. A. Nagornyy, Rostov Scientific Research Institute of Medical Parasitology, RSFSR Ministry of Health]

[Abstract] Clinical and socioeconomic analyses were conducted of an outbreak of trichinellosis in Tuapse affecting people who had eaten of an infected pig raised on a private lot. Of the 100 people who had eaten the pork containing 250-300 *Trichinella spiralis* larvae per gram of meat, 43 came down with trichinellosis. Subclinical disease was diagnosed in 27 of the victims. In 3 of the subjects the disease followed a severe course with one lethal outcome, in 7 of the patients the course was moderate, and in 6 the course of the illness was mild. In terms of economic coefficients the total cost to the State represented 4217.1 rubles, including 1408.4 rubles expended on medical care, 790 rubles for social insurance, and 2018.7 rubles in lost productivity. In view of the economic aspects of trichinellosis, steps must be taken to ensure its complete eradication in endemic areas. References 8 (Russian).

12172/12955
CSO: 1840/404

UDC 616.342/.36-002.951.222.1

OPISTHORCHOSIS AND DUODENOCHOLEDOCHOPANCREATIC DISEASE IN RELATION TO FECAL
OPISTHORCHIS FELINEUS EGG COUNTS. PART 1. INCIDENCE OF OPISTHORCHOSIS IN
KHANTY-MANSIYSK

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 6,
Nov-Dec 85 (manuscript received 27 Sep 84) pp 22-29

[Article by A. M. Bronshteyn, Institute of Medical Parasitology and Tropical
Medicine, imeni Ye. I. Martsinovskiy USSR Ministry of Health, Moscow]

[Abstract] An analysis was conducted on the incidence of opisthorchosis in the Russian population of Khanty-Mansiysk, in relation to *O. felineus* fecal egg counts and prevalence of duodenocholedochopancreatic disease. Evaluation of 494 individuals showed infestation to be present in 55.9% of the subjects (57.6% with exclusion of children less than a year old). Age breakdown yielded a figure of 19.5% for one to 15 year olds, and 70.8% for those over 15 years of age. Children less than a year old were free of infestation with *O. felineus*. Peak incidence was observed in the twenties age bracket, remaining high until about 60 and thereafter showing a decline. Maximal counts of fecally-excreted eggs were observed for individuals in the 4th and 5th decades of life. The patterns of infestation and egg counts were correlated with ingestion of poorly-salted raw fish. Duodenocholedochopancreatic disease was diagnosed in 35.7% of the subjects, with 61% of the cases falling in the 40-60 year age bracket. However, there was no correlation between the incidence of duodenocholedochopancreatic disease and the egg counts. Figures 1; references 31: 23 Russian, 8 Western.

12172/12955
CSO: 1840/405

UDC 616.995.122.21-036.21-07:313.13

MEDICAL STATISTICS AND ECONOMIC ASSESSMENT OF SELECTED HEALTH INDICATORS IN AREA ENDEMIC FOR OPISTHORCHOSIS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 6, Nov-Dec 85 (manuscript received 4 Mar 85) pp 30-34

[Article by A. M. Bronshteyn and N. N. Ozeretskaya, Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow]

[Abstract] On the basis of examination of 296 Russian outpatient residents of Khanty-Mansiysk who were 14 or over years in age, 203 were found to suffer from chronic opisthorchosis. In the over 40 group, the incidence of digestive disorders was directly correlated with fecal egg counts (Opisthorchosis felineus). Correlation of egg counts with the incidence of digestive disorders showed that 17.7% of the individuals with diseases of the digestive organs had egg counts of more than 10,000 eggs/g, whereas only 5.9% of the individuals with egg counts of less than 10,000 eggs/g were so afflicted. Individuals with zero counts were free of digestive problems. In terms of lost workdays due to gastointestinal disorders the economic cost was calculated at 31 rubles/infested individual/year. Individuals excreting over 10,000 eggs/g represent a high-risk group in this respect. References 19 (Russian).

12172/12955
CSO: 1840/405

VEGETABLE-GROWING UNITS FOR ARCTIC VESSELS AWAIT PRODUCTION

Moscow VODNYY TRANSPORT in Russian 11 Jan 86 p 3

[Article by L. Plyasova, engineer of the technology department of the Ministry of the Merchant Fleet; D. Fedyunkin, senior science associate of the Belorussian SSR Academy of Sciences' Institute of Experimental Botany]

[Excerpt] In collaboration with specialists of the BSSR Academy of Sciences' Institute of Experimental Botany, a group of enthusiasts of the Murmansk Shipping Line developed a test unit called "Vitakon" (vitamin conveyor) for growing vegetables in 1983. This group was headed by Ye. Akivis-Shaumyan, former captain of the icebreaker "Krasin". The "Vitakon" has a plant-growing area of about 7 square meters. Fastened to its metal frame are three trays in which 10 plant holders are placed in two rows. Water for the plants is fed from below. Sodium-vapor lamps in fixtures are mounted above the plants.

The unit's artificial 'soil,' which was developed by the Belorussian academy, is a mixture of ion-exchange resins which are saturated with all the elements the plants need. These elements are not washed out by water; they are easily absorbed by the roots of the plants. This 'soil,' whose industrial production already has been organized, is capable of yielding 8-10 large harvests, after which it can be regenerated, i.e., be replenished with elements.

The work of the shipping-line group and the Belorussian scientists was a success. They were able to demonstrate that good harvests of green vegetables which are rich in vitamins can be obtained during long Arctic voyages. Radishes, Khibiny cabbage, spinach, dill, parsley and green onions became regular items on the ship's menu.

Experiment amassed on board the icebreaker "Krasin" made it possible to proceed to the next stage of the project: developing a shipboard unit for growing garden vegetables. A pilot unit was built late last year on board the nuclear-powered icebreaker "Leonid Brezhnev". The total growing area of this 'artificial garden' is 7.6 square meters. It has yielded harvests of 40 to 60 kilograms of green vegetables a month.

It would appear that all the main questions had been solved and all that remained was to introduce the unit on Arctic vessels and reap good harvests, or so it was thought at the Central Scientific Research Institute of the

or so it was thought at the Central Scientific Research Institute of the Merchant Fleet. All of this has proved to be not so simple in practice, however. Although they employ individual elements and assemblies produced by industry, the vegetable-growing units that have been developed and placed on board the icebreakers "Krasin", "Leonid Brezhnev" and now also the "Rossiya" are unique. Industrial production of the units in a modular variant must be organized.

Hopefully, questions of the life support and diet of crews of vessels which carry commercial cargo throughout the year in the Arctic will be reflected in the plans for research work of the Ministry of the Merchant Fleet for the 12th Five-Year Plan.

FTD/SNAP
/12955
CSO: 1840/382

UDC 612.664.36.014.41

REFRIGERATION OF MOTHERS MILK

Kiev KRIOBIOLOGIYA in Russian No 4, 1985 (manuscript received 24 Sep 84)
pp 28-31

[Article by A. M. Brazhnikov, S. N. Osipov, O. G. Komyakov, O. A. Filippenko, Ye. M. Fateyeva and V. I. Kopylova, Moscow Technological Institute of Meat and Dairy Industry; All-Union Scientific Research Institute for Food Concentrate Industry and Special Food Production; Nutrition Institute, USSR Academy of Medical Sciences, Moscow]

[Abstract] The special biological and immunological properties of mothers milk have led to the present study of the feasibility of freezing it for possible special purposes, such as nourishment for people working under extreme conditions. The present article reports on crystal formation under various freezing processes and structural impact on biologically valued substances. The tested substance was immunoglobulin, which was evaluated after freezing in liquid nitrogen at rates of 15, 10, 7 and 1°C/min. Tests were made from -20°C to -80°C at intervals of 20°. Results showed formation of needle-like ice crystals with accumulation of fatty globules in intercrystalline liquid at -20°C. At -40°C, dendrite formations were discerned, while further cooling brought increasingly complex crystals. Analysis showed that immunoglobulin content fell markedly as temperature decreased, apparently because of partial denaturation of protein at low temperatures. Temperatures of -20 to -40°C were recommended for freezing mothers milk to preserve immune substances. Figures 4; references 3 (in Russian).

12131/12955
CSO: 1840/322

UDC 575.224.22

TRANSPOSITIONS AND REVERSIONS OF VIRAL DNA-INDUCED MUTATIONS IN DROSOPHILA MELANOGASTER

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 286, No 2, Jan 86
(manuscript received 16 Jul 85) pp 447-450

[Article by T. V. Shandala and S. M. Gershenson, academician of UkSSR Academy of Sciences, Institute of Molecular Biology and Genetics, UkSSR Academy of Sciences, Kiev]

[Abstract] The mechanism of mutagenic action of exogenous DNA has not been established as yet. An assumption was made that mutations induced by exogenous DNA are subject to insertion of fragments of foreign DNA serving as a mutagen. Showing that such mutations are capable of transpositions and reverersions would support their insertional nature. Experimental results were reported on transposition and reversion of two visible mutations induced by viral DNA of nuclear polyhedrons of the large wax moth: nicked wings mutation (Ndw, dominant with recessive lethal effect) and thickened veins mutations (Thi, recessive). In all the crossings of standard laboratory lines no indications were seen for hybrid dysgenesis. Both Nd_w and Thi were found to be capable of reverting to the normal state at a frequency of $7 \cdot 10^{-3}$ and $2 \cdot 10^{-2}$ respectively. These data did not exclude the role of mobile genetic elements. Figure 1; references 13: 10 Russian, 3 Western (1 by Russian authors).

7813/12955
CSO: 1840/362

UDC 575.23:582.28

PROTOPLAST FUSION IN PHYTOPATHOGENIC FUNGUS PYRICULARIA ORYZAE CAV.

Moscow GENETIKA in Russian Vol 21, No 5, May 85 (manuscript received 16 May 84)
pp 716-723

[Article by N. S. Zhemchuzhina and V. G. Dzhavakhiya, All-Union Scientific Research Institute of Phytopathology, Moscow Oblast]

[Abstract] Genetic analysis in phytopathogenic fungus *Pyricularia oryzae* is difficult because a reliable and reproducible hybridization method is not available. Parasexual process appears to be the only reliable method but several publications have noted that anastomoses form only on crossing mutants of the same strain, if at all. One of possible ways to overcome the barriers of vegetative incompatibility is to perform fusion of protoplasts. In the present work, products of protoplast fusion of *P. oryzae* mutants marked by morphological and biochemical characteristics was studied. The fusion was induced with polyethylene glycol. Prototrophic colonies were obtained in all paired combinations of auxotrophic mutants studied, which were obtained from the same natural isolate of *P. oryzae*. Monoconidial analysis of these colonies identified parental and recombinant types in the offspring suggesting their hybrid nature. High number of prototrophic conidia formed suggests high frequency of diploidy during formation of *P. oryzae* heterokaryons. Inheritance pattern of parental characteristics suggests recessive nature and cytoplasmic localization of the mutations reducing the colony growth rate and nuclear localization of genes controlling mycelium color. Auxotrophic markers in the offspring of hybrid colonies occur evidently as a result of haploidization. References 13: 5 Russian, 8 Western.

7813/12955
CSO: 1840/377

UDC 579.252.55:579.256.4

PHYSICAL AND GENETIC ORGANIZATION OF PLASMID R15

Moscow GENETIKA in Russian Vol 21, No 5, May 85 (manuscript received 28 Jun 84)
pp 748-755

[Article by A. P. Dobritsa, T. G. Mikhaylova and V. I. Dubovaya, All-Union Scientific Research Institute of Applied Microbiology, Moscow Oblast]

[Abstract] Plasmids of incompatibility group IncN have a large number of hosts and are widely disseminated in nature. Some of these plasmids carry important genes such as restriction-modification, reparation and DNA specific polymerase genes. Results of restriction and genetic analysis of IncN-plasmid R15 isolated from the cells of *Proteus vulgaris* is reported. The map of R15 plasmid shows localization of 43 restriction sites: 5 -- BamHI, 9 -- BgIII, 6 -- EcoRI, 9 -- HindIII, 4 -- SalI, 4 -- SmaI, 4 -- PstI and 2 -- XhoI. By cloning restriction fragments of DNA R15 and its derivatives pAD816 and pAD822, distribution of the areas was determined containing genes of replication, conjugation and resistance towards Sm, Su, Hg and of genes coding restriction-modification functions of EcoRII. Vast majority of the sites (28/32) for BamHI, EcoRI, HindIII, SalI, SmaI and PstI were close to or within the sequences of transposable elements Tn2353 and Tn2354. Comparative analysis of genetic and physical structures of R15 and other IncN-plasmids was performed. Figures 3; references 26: 2 Russian (1 by Western authors), 24 Western (4 by Russian authors).

7813/12955
CSO: 1840/377

UDC 575.232.2:567.857.48

ENHANCEMENT OF ESCHERICHIA COLI URIDINE PHOSPHORYLASE (udp) GENE EXPRESSION
AS CONSEQUENCE OF DUPLICATIONS

Moscow GENETIKA in Russian Vol 21, No 5, May 85 (manuscript received
31 Jul 84) pp 756-762

[Article by R. A. Alkhimova, V. V. Sukhodolets and A. S. Mironov, All-Union
Scientific Research Institute of Genetics and Selection of Industrial Micro-
organisms, Moscow]

[Abstract] Structural gene of udp enzyme which catalyzes the breakdown of uridine is mapped at the 85 min of the *E. coli* chromosome chart. It is a good model for selection of various types of mutations leading to increased expression of this gene. udp Enzyme is also capable of catalyzing conversion of exogenic thymine to thymidine. An attempt was made to determine whether it would be possible to obtain active mutations promoters of gene udp or to find how to increase its expression in the cell. Gene udp is found in the area of ribosomal RNA:rrn-operon locations. These operons are straight homologous repeats and therefore in this area the chromosomes undergo tandem duplications of elongated segments as a result of uneven crossing-over. On the basis of experimental data obtained it was concluded that enhanced expression of udp gene was achieved by "promotor-up" type mutations and by duplication of udp gene either alone or with the neighboring gene met E. References 27: 8 Russian (1 by Western author), 19 Western (1 by Russian authors).

7813/12955
CSO: 1840/377

UDC 575.24:633.16

MULTIVARIABILITY OF GENETIC HOMEOSTASIS AND POTENTIAL FOR INCREASING EFFECTIVENESS OF INDUCED MUTAGENESIS IN BARLEY

Moscow GENETIKA in Russian Vol 21, No 5, May 85 (manuscript received 9 Sep 83, after final revision, 30 Jul 84) pp 809-817

[Article by M. A. Pitirimova, Agrophysical Scientific Research Institute, Leningrad]

[Abstract] Plants are complex self-regulating systems which are capable somehow of repairing damage to their genetic apparatus induced by mutagens. An attempt was made to address the question of how are the initial changes eliminated, what are the reasons for low yields of mutant forms with useful characteristics when plants are irradiated or exposed to alkylating compounds. Results of long term research on changes in barley were reported related to mutagenic factors: the dose, physiological state of the organism and conditions of M_1 propagation. Changes induced by mutagens in genetic cell apparatus at different levels of biological integration occur during the period of two generations; the principal elimination of genetic changes occur in M_1 . It was shown to be possible to use various modifiers which could change the composition of a growing organism in the desired direction, inducing an effective process of directed mutation by selecting plants in M_1 whose productivity exceeds substantially its variant mean. It is impractical to concentrate on micromutation. Figures 3; references 27: 22 Russian, 5 Western.

7813/12955
CSO: 1840/377

UDC 576.1:576.312.342:576.858.9

EFFECTIVE TRANSDUCTION METHOD WITH VIRULENT PHAGE pfl6 USING SPECIFIC MUTANTS
OF PSEUDOMONAS PUTIDA PpG1

Moscow GENETIKA in Russian Vol 21, No 5, May 85 (manuscript received 12 Jul 84)
pp 872-874

[Article by S. A. Gorbunova, V. Z. Akhverdyan, L. V. Cheremukhina and V. N. Krylov, All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow]

[Abstract] Pseudomonas putida bacteria are interesting producers of proteins and secondary metabolites as well as carriers of many biodegradation plasmids. A simple procedure for selection of *P. putida* mutants PpG1 is described. Wild type PpG1 and PpG338 (trp⁻) strains of *P. putida* were received from George Shapiro (USA). The mutants obtained could be used in transduction experiments with virulent phage pfl6. Using this method any potential recipient could yield acceptable variants of PpG1 for transduction in one stage selection of phage resistant clones with specific type of phage resistance (af^S, tf², pf 16^r). Using bacteria PpG1 rif^rilv^r(B391pc) and newly-selected mutants PpG1338 trp⁻, the stability of transduction was checked, its frequency and dependence on pfl6 phage infection. It was shown that for various mutants the frequency of transduction varied, but it was reproduced in all cases. Phages af and tf are incapable of transducing bacterial markers. The frequency of transduction of chromosomal markers ilv and trp was 10⁻⁶ and that of plasmid RP4 with phage pfl6 was 10⁻⁷. Figure 1; references 7: 2 Russian, 5 Western.

7813/12955
CSO: 1840/377

UDC 575.222.73:567.851.5

BACILLUS LICHENIFORMIS PROTOPLAST FUSION

Moscow GENETIKA in Russian Vol 21, No 5, May 85 (manuscript received 12 Jul 84)
pp 875-877

[Article by N. G. Yaroslavtseva, V. I. Zvenigorodskiy and V. G. Zhdanov,
All-Union Scientific Research Institute of Genetics and Selection of Industrial
Microorganisms, Moscow]

[Abstract] *Bacillus licheniformis* cultures synthesize the antibiotics bacitracin and penicillin and proteases. Production of industrial strains is very limited. Data are reported indicating the possibility of producing recombinants from fusion of protoplasts from auxotrophic strains of *Bac. licheniformis*. Double auxotrophic mutants of strain 1001 were used as parents: 1001ura⁻thr⁻ and 1001arg⁻his⁻. Auxotrophic and paratrophic recombinants were tested for antibiotic activity showing a wide spectrum of activity (from 10 to 150% of the activity of starting strain 1001). The protoplast fusion method expands the available techniques for genetic-selection studies of *Bac. licheniformis* culture. References 7: 4 Russian, 3 Western.

7813/12955
CSO: 1840/377

UDC 591.105:577.155.2

SPECIFICS OF TRANSCRIPTION ACTIVITY OF LIVER NUCLEAR DNA DURING PROLONGED ADAPTATION TO HIGH ALTITUDE HYPOXIA

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA No 1, Jan-Feb 85
(manuscript received 26 May 82) pp 25-29

[Article by G. S. Komolova and I. A. Yegorov, Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences, Moscow]

[Abstract] A study was made of the specifics of the transcribing activity of liver DNA upon long-term adaptation to continuous pressure chamber hypoxia. The work was performed on Wistar rats weighing 180 to 270 g. The animals were adapted to hypoxia in a pressure chamber, five hours per day. The altitude increasing each day by 1000 m, beginning at 1500 m and continuing to 5500 m, which altitude was maintained throughout the remainder of training. Animals were trained 30 days into the first generation, sixty days in the second generation. The intensity of biosynthesis of nuclear RNA was judged from the inclusion of radioactive precursors. Molecular DNA-RNA hybridization was performed on nitrocellulose filters. DNA was removed from the liver nuclei by the detergent method. An increase in the inclusion of the radioactive precursor in nuclear RNA in the livers of rats adapted in the first generation was observed both *in vivo* and *vitro*, indicating that it reflects intensification of the transcription process, not a change in the level of endogenous RNA biosynthesis precursors. Upon long-term adaptation to hypoxia in the second generation, the composition of nucleotide sequences transcribed on the DNA changes in spite of the lack of changes in nuclear RNA biosynthesis intensity. This indicates that changes occur in the genetic apparatus of the liver cells in the process of adaptation to hypoxia. The nature of the changes varies, depending on the stage of the adaptation process. Figures 4; references 17: 7 Russian, 10 Western.

6508/12955
CSO: 1840/1014

UDC 591.158

CORRELATION BETWEEN EMOTIONAL STRESS AND CHROMOSOME-1 RECOMBINATION FREQUENCY
IN DOMESTIC MOUSE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 286, No 3, Jan 86
(manuscript received 31 Oct 85) pp 726-728

[Article by P. M. Borodin and D. K. Belayev (deceased), academician, Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] C57L/1 mice were employed in an analysis of the effects of emotional stress induced by prolonged immobilization on the recombination frequency in chromosome-1, to followup previous studies demonstrating such an effect in the case of chromosome-2. The studies were conducted with male progeny obtained by mating +Sp+/fz+ males with Fz+ln/Fz+ln females (mutations: Sp -- sploch, fz -- fuzzy, ln -- leaden), who were immobilized for 10 days at the age of 12-14 weeks and mated at various subsequent periods of time. Thus, the females were fertilized with spermatozoids at various stages of spermatogenesis. Analysis of the recombination frequencies between marker genes on chromosome-1 showed a significant increase in the recombinant frequencies of progeny of males stressed 20 days before mating. The increase in the frequency of recombination between fz and ln (0.4558 ± 0.0290) was significant ($P < 0.95$) in comparison with control value (0.3769 ± 0.0182), and that for crossing-over in the fz-Sp region was close to significant. Since stress affects genetic recombination, it appears that it might be a significant factor in determining evolutionary trends. References 10: 2 Russian, 8 Western.

12172/12955
CSO: 1840/364

UDC 579.841.31:579.253.4].04:577.2

USE OF TRANSPOSONS FOR MUTAGENESIS OF *R. PHASEOLI* AND *R. JAPONICUM*

Moscow MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian
No 9, Sep 85 (manuscript received 18 Oct 84) pp 19-22

[Article by T. V. Ivashina, B. M. Chatuyev and K. M. Zlotnikov, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino, Moscow Oblast]

[Abstract] Mutagenesis potential of transposons Tn5 and Tn7 was studied on bacteria of strains *Rhizobium phaseoli* 221 and 693 as well as *R. japonicum* 110, transferring them with conjugative plasmid pPHIJI::Tn7 followed by elimination with RP4 plasmid or by plasmids incapable to replicate and maintain themselves in *Rhizobium* cells. Plasmid pSUP2011 was used effectively leading to isolation of auxotrophic and symbiotic mutants of these strains (4% in *R. japonicum* 110 and 0.6% in *R. phaseoli* 693). The following mutants were isolated: in *R. japonicum* 110 -- Met⁻, Asp⁻, Nod⁻ and Fix⁻; in *R. phaseoli* 693 -- Met⁻, Leu, Ade⁻, Bio⁻ and Fix⁻. Streptomycin resistance gene locating on Tn5 was phenotypically expressed in these cells. Thus, the effectiveness was demonstrated of Tn5 induced mutagenesis in these cells using plasmid pSUP 2011. In *R. japonicum* the Tn5 mutagenesis was observed for the first time. References 25: 6 Russian, 19 Western.

7813/12955
CSO: 1840/376

UDC 612.766.1+612.825.8

SWEATING REFLEX IN COMPLEX OF METHODS FOR EVALUATING OPERATOR EFFICIENCY

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian Vol 31, No 6, Nov-Dec 85
(manuscript received 12 Nov 84) pp 678-682

[Article by P. P. Slynko, L. I. Bukvareva, S. V. Zaporozhets and P. M. Onishchenko, Institute of Physiology, Kiev University]

[Abstract] A special method has been developed for recording emotionally-induced perspiration, and has been used to obtain data on changes in the functional status of human subjects. The purpose of this work was to select the most informative and adequate indicator of the functional status of the human subject to allow its use to determine the level of awareness of human operators. Some forty experiments were performed on 18 student volunteers involving recording of the electrical resistance of the skin, the intensity of emotionally-induced perspiration and the heart rate, as various assignments and tests were performed. Primary attention was given to analysis of the dynamics and interrelationships among the characteristics recorded. The characteristic of emotionally-induced perspiration was found to have a significantly broader dynamic range than the other measured characteristics, indicating its great sensitivity. High correlation was observed among the three characteristics measured. Emotionally-induced perspiration reveals good information, allowing it to be recommended as the major indication of the efficiency of a transport driver in cases where continuous monitoring of the functional status using the minimum number of parameters is required. Figure 1; references 15 (Russian)

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UDC (616-006.04:547.96):577.122

ANTIMETASTATIC EFFECT OF LIPOSOME-ENCAPSULATED SYNTHETIC ANALOGUE OF MURAMYL DIPEPTIDE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 286, No 2, Jan 86
(manuscript received 22 Aug 85) pp 474-476

[Article by V. Yu. Umanskiy, A. V. Stefanov, G. V. Los, T. M. Andronova, K. P. Balitskiy, V. G. Pinchuk and Academician of UkSSR Academy of Sciences V. K. Lishko]

[Abstract] Effect of free and liposome-encapsulated (LE) N-acetylglucosaminyl-N-acetylmuramyl-L-alanyl-D-isoglutamine (GMDP) on development of lung metastases in C57Bl mice injected with Lewis long carcinoma cells (metastasizing) was studied along with the activity of purine metabolism enzymes: adenosine deaminase (ADA) and 5'-nucleotidase (5-H) in alveolar macrophages. In a preliminary test it was shown that administration of GMDP to intact animals had no effect on the enzymes in alveolar macrophages; administration of LE-GMDP increased activity of ADA and 5-H 3.6 and 4.9 fold, respectively; treatment with liposomes alone or with GMDP adsorbed on liposome surface showed a lower activation of macrophages. When animals with lung metastases were exposed to these agents, free GMDP had no effect on the size or number of metastases; use of liposomes only slowed down the growth of metastases while LE-GMDP showed maximum antimetastatic effect. Thus, only encapsulated GMDP was effective; evidently, liposomes facilitate long lasting circulation of the preparation in blood protecting it from rapid deactivation by proteolytic enzymes and facilitating the capture and accumulation of GMDP by organs containing many macrophages. Figures 2; references 15: 7 Russian (1 by Western authors), 8 Western.

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UDC 612.017.1:547.466

AMINO ACIDS AS STIMULATORS OF IMMUNOGENESIS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 286, No 2, Jan 86
(manuscript received 15 Oct 85) pp 471-473

[Article by G. A. Belokrylov, I. V. Molchanova and Ye. I. Sorochinskaya,
Scientific Research Institute of Experimental Medicine, USSR Academy of
Medical Sciences, Leningrad]

[Abstract] The goal of this work was to study direct immunomodulating effect of amino acid components of protein using two criteria: in vitro effect of amino acids on differentiation of T-cell precursors of bone marrow into T-lymphocytes and their ability to stimulate thymus-dependent immune response in test animals (CBA male mice). Nine out of 20 amino acids studied accelerated differentiation of T-cell precursors to T-lymphocytes in the decreasing order: aspartic acid, glutamic acid, cysteine, serine, tryptophan, threonine, asparagine, valine and alanine. They increased immune response to sheep erythrocytes. Next, it was shown that thymopentine (HArgLysAspValTyrO) showed an immunostimulating effect similar to aspartic acid; a mixture of amino acid components of thymopentine had no effect. The data showed that immunologic activity exhibited by immunoactive peptides may also be shown by individual amino acids. References 12: 4 Russian, 8 Western.

7813/12955
CSO: 1840/362

UDC 616-006-018.1-092:612.017.1.014.46:615.324.547.952

INVESTIGATION OF MOLECULAR AND CELLULAR MECHANISMS OF ACTION OF LIPID
IMMUNOMODULATORS

Moscow MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian
No 9, Sep 85 (manuscript received 17 Oct 84) pp 38-43

[Article by B. B. Fuks and A. G. Sterlina, Institute of Human Morphology,
USSR Academy of Medical Sciences, Moscow]

[Abstract] In recent years the existence of immune protection against tumor growth was questioned. Earlier studies considered immune reactions against various tumors based on many effector mechanisms but primarily at the early stages of tumor growth. The utilization of effector mechanisms and regulatory lymphocyte-amplifiers in immunotherapy of already developed tumors is a very recent advance. New regulator-effector mechanisms and lipid-containing factors against tumors were studied. It was shown that addition to lymphocyte culture (in vivo and in vitro) of low concentrations (0.03 to 0.12 ug/ml) of polysialogangliosides and phospholipids containing unsaturated fatty acids leads to proliferation of lymphocytes, synthesis of interleukin 2 and generation of highly active killer cells capable of destroying syngeneic, allogeneic and xenogeneic tumor cells. In mice this led to irreversible regression of transplantable tumors (leukemias, sarcomas and Ehrlich carcinoma). Figures 3; references 18: 5 Russian, 13 Western.

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CSO: 1840/376

LASER EFFECTS

UDC 577.391:616-006

INFLUENCE OF LOW-ENERGY LASER RADIATION ON NORMAL SKIN AND CERTAIN TUMOR
TISSUES

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA No 1, Jan-Feb 85
(manuscript received 25 Jun 82) pp 134-136

[Article by S. D. Pletnev and O. M. Karpenko, Moscow Scientific Research
Institute of Oncology imeni P. A. Gertzen]

[Abstract] For some years, the authors' Institute has studied the influence of various types of low-energy laser radiation on normal tissue and the growth of tumors. Radiation at 3 and 30J/cm² causes an increase in biological activity of various cell elements, manifested as an increase in mitotic activity of the cells in the basal layer of the epidermis, conglomeration of chromatin in the cell nuclei and an increase in degranulation of fat cells in the process of their migration to the reticular layer, an increase in content of fibroblastic and lymphohistocytic elements in the dermis, as well as an increase in collagenization of connective tissue. It is found that irradiation of the skin by helium-neon, cadmium-helium and nitrogen lasers before and after grafting of the cells of various tumors modifies the course of the tumor process. This effect is apparently related to the fact that systematic irradiation results in changes creating a favorable background for survival and proliferation of tumor cells in the skin tissue medium. The changes facilitate an increase in survival and growth of both pigmented and nonpigmented tumors. Low power radiation stimulates the activity of the cells or cell structures; medium power stimulates their activity; high power suppresses activity.

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INFLUENCE OF LOW INTENSITY LASER RADIATION ON IMMUNE SYSTEM

Moscow SOVETSKAYA MEDITSINA in Russian No 7, Jul 85 (manuscript received 24 Dec 84) pp 8-12

[Article by V. I. Kupin, A. M. Sorokin, A. V. Ivanov, R. M. Lapteva and Ye. V. Polevaya, All-Union Oncologic Scientific Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] A study was made of the influence of laser radiation of safe intensity on some immune indices in human peripheral blood. Immunocompetent cells, the receptors of which are quite sensitive to external actions, were studied. Isolated lymphocytes were irradiated for 15 minutes at 30 W/m^2 in Petri dishes. It was found that helium-neon laser radiation, while activating the process of T and B rosette formation, did not influence the production of α and γ interferon. The stimulating effect without inhibiting the formation of interferon can be useful in the application of laser radiation in cancer treatment. References 17: 13 Russian, 4 Western.

6508/12955
CSO: 1840/1055

PRODUCTION OF REAGENT SETS FOR RADIODIAGNOSIS

Minsk SOVETSKAYA BELORUSSIYA in Russian 24 Jan 86 p 2

[Article by S. Yuryev, interviewer]

[Excerpt] Construction of the USSR's first experimental facility for producing radiodiagnostic kits is nearing completion at the Belorussian SSR Academy of Sciences' Institute of Bioorganic Chemistry in Minsk. These kits ensure quick diagnosis of various illnesses and their causes, by means of medical microanalysis outside the patient's body. Our correspondent asked Candidate of Chemical Sciences V. L. Chashchin, deputy director of the institute, about this.

"What is the role of Belorussian scientists in research of mechanisms of immunochemical reactions?"

"Under the direction of Afanasiy Andreyevich Akhrem, member of the Belorussian academy, research aimed at studying so-called block-ligand interactions was carried out successfully at our institute. Since then, the institute has been the country's chief organization for this problem, and it has been assigned the task of developing a unique production process and manufacturing test lots.

"We are already producing 11 of the 18 types of sets of reagents for radioimmunologic determination of substances (RIO kits) that have been developed in our country. We are now shipping these kits to more than 500 medical institutions in 72 cities of the USSR. Contracts have been concluded for supplying RIO kits to a number of member-countries of the Council for Mutual Economic Aid. Whereas we assembled 1,000 RIO kits in 1983, 14,000 were assembled in 1985.

"We have learned how to detect and identify, with an extremely high degree of sensitivity (one-billionth of a milligram), those physiologically active substances on which functions of the thyroid and adrenal glands and the phyto-placental, endocrine, reproductive and other vital systems of the human body depend. The concentration in human blood serum of insulin, hydrocortisone, progesterone, testosterone, carcinoma-embryonal antigen and many other material carriers of biological information can be determined with the aid of our RIO kits."

FTD/SNAP
/12955
CSO: 1840/383

MAKER OF EQUIPMENT FOR MONITORING PATIENTS, PRODUCTION PROCESSES

Moscow PRAVDA in Russian 6 Feb 86 p 1

[Article by Yu. Knyazev, correspondent]

[Excerpt] The "Elektropribor" (electrical instrument) Production Association of Cheboksary has begun series production of new computerized information complexes called "Gamma". They are intended for making up complex diagnostic units with which physicians will be able to quickly determine the condition of patients.

The "Gamma" is only one of a number of new products which are supposed to be put into production during the 12th Five-Year Plan period. Before long the association will begin making microprocessor-based sets of equipment for remote control of complex equipment at metal production enterprises.

Reconstruction of the Association is continuing. An automated line is now being put into operation. Dozens of robots and manipulators are already operating.

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OFF-ROAD AMBULANCE WITH OPERATING ROOM

Moscow IZVESTIYA in Russian 30 Dec 85 p 3

[Article by Zh. Mindubayev, correspondent [Ulyanovsk]]

[Text] A bright yellow vehicle, which is a small van produced by the "Avtouaz" Association, has appeared on the streets of Ulyanovsk. This is the first specialized operating room on wheels. It was developed by Ulyanovsk motor vehicle builders in collaboration with Finnish medical specialists and designers.

An off-road ambulance produced by the Ulyanovsk plant is a familiar sight in almost all parts of the country. But this emergency vehicle could not be called an ideal one: its set of diagnostic equipment is not complete. It is not sufficient, for example, for performing an operation at the site of an auto accident.

Now something different is at hand. The van has been re-outfitted; it has become airtight, so that a prescribed temperature can be maintained. The off-road ambulance is equipped with absolutely everything necessary, even x-ray equipment, for making a diagnosis and beginning an operation directly at the site -- in a field, or on the shoulder of a highway.

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/12955
CSO: 1840/382

COLLAGEN PREPARATION 'KOMBUTEK-2' FOR BURNS AND WOUNDS

Moscow MEDITSINSKAYA GAZETA in Russian 15 Jan 86 p 3

[Article by M. Kuzin, director of the Institute of Surgery imeni A. V. Vishnevskiy, USSR Academy of Medical Sciences, academician of the Academy of Medical Sciences of the USSR; A. Adamyan, laboratory head, doctor of medical sciences and S. Andreyev, senior scientific co-worker]

[Excerpt] The "Belkozin" plant in Luga is preparing for industrial production of the first Soviet collagen preparation for treating wounds and burns. This preparation, which is called "Kombutek-2", was developed by associates of the USSR Academy of Medical Sciences' Institute of Surgery imeni Vishnevskiy, and All-Union Scientific Research Institute of the Meat Industry.

The preparation's stimulating effect is based on the direct action of its decay products on biosynthesis of collagen in tissues that are being repaired. The preparation promotes proliferation of fibroblasts and synthesis of DNA and RNA in cells, speeds the maturation of granulation tissue, and intensifies biosynthesis of collagen and the formation of mature collagen fibers. It protects the surface of a wound against infection and reduces desiccation of the wound.

"Kombutek-2" is a combined preparation which is prepared on the basis of a 0.6-percent solution of collagen with an addition of glutaric aldehyde, quino-sol, boric acid and Tween-80. The collagen is obtained from the hides and Achilles tendons of cattle. The covering is a homogeneous, soft-elastic porous layer 0.5-1.0 centimeter thick, which is highly hygroscopic.

Clinical tests have shown that "Kombutek-2" is an effective agent for the closing and final local healing of burns of degrees II-IIa, tropic ulcers, bedsores, flat granulating post-traumatic wounds, and wounds from which grafts are taken.

The cover is applied in the form of applications. In cases of burns of degrees II-IIa, necrotic tissues are removed from the surface of the wound in advance; the surface is treated with antiseptic solutions (such as iodo-piron or khlorgeksidin), and a layer of "Kombutek-2" and one or two layers of gauze are applied (without wadding).

In cases of IIIb-degree burns, "Kombutek-2" is employed also for temporary (24-48 hours) closing of wounds following cutting away of necrotic tissues prior to dermatoautoplasty.

We would like to note in conclusion that scientists are now developing a number of effective collagen preparations with various functional applications for the treatment of burns and wounds. At the same time, the majority of surgeons of polyclinics and traumatology centers are not familiar with the capabilities and therapeutic properties of these preparations. This deficiency must be corrected, especially since plans are now being made to produce "Kombutek-2" in a volume which depends largely on the number of orders received from hospitals.

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TESTING FOR HYPERTENSION

Moscow LENINSKOYE ZNAMYA in Russian 28 Jan 86 p 3

[Article by Ye. Kheyfits, correspondent of "Nauka v SSSR" journal]

[Abstract] The etiology of hypertension has long remained a mystery, until some key research on cell membranes done by Yu. V. Postnov, doctor of medical sciences, and S. N. Orlov, doctor of biological sciences, of the Central Scientific Research Laboratory of the USSR Ministry of Health in Moscow. Postnov and Orlov demonstrated that the roots of hypertension lay in a defective pumping mechanism responsible for removing excess calcium ions from inside a cell to the outside of the cell membrane. Elevated intracellular calcium levels lead to hypertension. A convenient way in which people can be tested for predisposition to hypertension, i. e., to determine whether the cell membranes function normally in an individual, is to study the permeability of erythrocytic membranes. This can be accomplished during routine tests carried out in clinical chemistry laboratories on readily available blood samples, and thereby lends itself to screening for hypertension.

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CSO: 1840/368

MOLECULAR ONCOLOGY

Moscow PRIRODA in Russian No 11, Nov 85, pp 58-66

[Article by F. L. Kiselev, Doctor of Biological Sciences, Chief of the Laboratory of Molecular Biology of Viruses, Scientific Research Institute of Carcinogenesis, All-Union Oncologic Scientific Center, USSR Academy of Medical Sciences]

[Abstract] A brief and popular history of the theories which have been developed to explain the transformation of a normal cell to a cancer cell is presented. The contributions of molecular biology to merging of the theories of carcinogenesis predominant in oncology in the 1950s and 1960s with contemporary data obtained in the study of the molecular oncogene mechanisms of carcinogenesis are noted. It has been learned that use of the theories of earlier days reflected but one aspect of the complex process known as carcinogenesis. Today these theories and studies of virally-stimulated oncogene activation have merged into a single and structured theory of carcinogenesis. Figures 5; references 9: 6 Russian, 3 Western.

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CSO: 1840/1061

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CLINICAL COURSE AND TREATMENT OF STRONGYLOIDIASIS COMBINED WITH OTHER
INTESTINAL HELMINTHOSES IN NATIVES OF TROPICS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 5,
Sep-Oct 85 (manuscript received 30 Oct 84) pp 42-46

[Article by E. P. Tikhomirova, A. F. Prokhorov and L. A. Lysakova, Rostov
Scientific Research Institute of Medical Parasitology, RSFSR Ministry of
Health]

[Abstract] Medical evaluation of 40 citizens of Cambodia, Laos and Vietnam
at the Rostov Institute of Medical Parasitology resulted in the diagnosis
of strongyloidiasis in combination with other intestinal helminthoses in 39
of the subjects, with strongyloidiasis as the sole infestation in only one
individual. The clinical course was generally moderate, with only 21 (52.5%)
of the patients complaining of abdominal pain, headache, gastrointestinal
dysfunction, weakness and other typical symptoms. In 19 patients the course
was subclinical. Laboratory studies revealed eosinophilia in all 40 subjects,
as well as a number of other hematologic changes, including dysproteinemia,
and elevation of amylase activity in 28 subjects of the cohort. Direct bili-
rubin was elevated in 5 subjects. With recovery, as a result of standard
therapeutic measures, subjective and laboratory results showed improvement,
with considerably delay in the recovery of functional normality of the small
intestine. Figures 1; references 12: 10 Russian, 2 Western.

12172/12955
CSO: 1840/404

UDC 579.842.23:579.253].04:578.81

INTERACTION OF YERSINIA PESTIS BACTERIA WITH BACTERIOPHAGE Mu

Moscow MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian
No 9, Sep 85 (manuscript received 21 Feb 85) pp 6-11

[Article by A. V. Rakin, S. A. Lebedeva and G. I. Aleshkin, Rostov-na-Donu
Scientific Antiplague Research Institute; Scientific Research Institute of
Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical
Sciences, Moscow]

[Abstract] Literature data on the sensitivity of *Y. pestis* to bacteriophage Mu are scarce, therefore the interactions of plague pathogen bacteria with thermosensitive mutant of phage Mu -- the bacteriophage Mucts 61 -- were investigated. Experimental results showed that *Y. pestis* cells are sensitive to bacteriophage Mucts62 infections and that their DNA can replicate in its cells although with some modifications. Lysis of bacteria was more efficient on solid nutrient medium than in liquid LB medium "Difco". Lysogenization of *Y. pestis* cells was not observed using standard bacteriophage infection methods. It was shown to be possible to obtain RP4::Mucts62 lysogens of *Y. pestis* for use along with Mucts phage in genome analysis of various representatives of *Y. pestis*. Plague microbe lysogens produced bacteriophage Mucts62 spontaneously at a titer of 10^2 to 10^3 pfu/ml and after thermoinduction -- 10^4 to 10^5 pfu/ml. The production of phage particles from infected *Y. pestis* cells EV76 began 45 min later than production from *Escherichia coli* and was prolonged. Figures 6; references 15: 4 Russian (1 by Western author), 11 Western.

7813/12955
CSO: 1840/376

MICROBES AS HARVEST STIMULANTS

Riga NAUKA I TEKHNIKA in Russian No 12, Dec 85 pp 9-10

[Article by Anna Klintsare, candidate of biological sciences]

[Abstract] Scientists have come to appreciate the importance of epiphytic microorganisms in the metabolism and physiology of plants, and have designed means of using such microbes in improving crop harvests. Basically, these are microorganisms that exist on plants in a symbiotic relationship and contribute to this association by producing vitamins, heteroauxins, cytokinin-like substances and other metabolites. Depending on the species, their numbers on a plant range from the hundreds to millions. On grain crops approximately 90% of the microorganisms are nonsporogenic bacteria, such as *Pseudomonas*, *Mycobacterium*, *Chromobacterium* and *Micrococcus*. Among the more frequently found yeasts are members of the *Rhodotorula*, *Cryptococcus*, *Trichosporon*, *Pullularia* and *Geotrichum* genera. Studies at the Institute of Microbiology of the Latvian SSR Academy of Sciences have shown that seed pretreatment with preparations of *Pseudomonas lacticum* have been effective in raising the harvest of sugar beets and carrots by 10-15%. This observation fits in well with the beneficial effects on metabolic vigor that such seeds and their plants exhibit, and suggests an obvious microbial solution to harvest improvement in general. Researchers at Dnepropetrovsk University, using the same bacterial preparation, have demonstrated that the root system of plants so treated was more efficient in the degradation of phenolic pollutants in the soil stemming from coal chemistry plants, again confirming the importance of the plant-microbe interaction. Figures 3.

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COMPARATIVE CHARACTERISTICS OF BIODESTRUCTION OF FLUORINE-CONTAINING POLYMERS
BY VARIOUS MICROORGANISMS

Yerevan BIOLOGICHESKIY ZHURNAL ARMENII in Russian No 8, Aug 85
(manuscript received 12 May 85) pp 729-730

[Article by M. A. Mirzoyan and L. S. Khachatryan, Institute of Microbiology,
Armenian SSR Academy of Sciences]

[Abstract] Data are presented on the influence of microorganisms on fluorine-containing polymer materials. A quantitative criterion for comparative estimation of the aggressiveness of bacterial cultures is presented. Results of studies of fluorine-containing polymers of varying chemical structure were statistically processed to determine the standard deviation and variation factor. The microorganisms tested were found to differ in destructive effect on fluorine-containing polymers. Molecular and supermolecular changes resulted in changes in viscosity of polymer solutions, particularly in copolymers containing ether bonds in their side chains.

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UDC 576.8

INFLUENCE OF NATURAL ZEOLITE ADSORBENTS ON OXIDATION OF DIESEL FUEL BY BACTERIA RHODOCOCCUS ERYTHROPOLIS AND PSEUDOMONAS AERUGINOSA

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA, SERIYA 16, BIOLOGIYA in Russian
No 4, Oct-Dec 85 (manuscript received 10 Feb 84) pp 20-24

[Article by V. K. Dorokhov, V. A. Yanushka, V. V. Ilinskiy and T. V. Koronelli]

[Abstract] A study was made of the influence of certain natural zeolites on the oxidation of diesel fuel by carbohydrate-oxidizing bacteria of two strains differing in cell wall structure: Rhodococcus erythropolis and Pseudomonas aeruginosa. The zeolites had differing effects on consumption of the diesel fuel by bacteria of the different genera, probably as a result of the differing cell wall structure of the two strains and related differences in methods of adsorption of the hydrophobic substrate. Further studies are required before zeolites can be used as agents to regulate the consumption of diesel fuel by bacteria. References 10: 9 Russian, 1 Western.

6508/12955
CSO: 1840/1043

UDC 581.143.6:581.557

PHYSICAL-CHEMICAL MEDIUM FACTOR CHANGES IN GINSENG AND CYANOBACTERIUM CELL ASSOCIATIONS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA in Russian No 1, Jan-Feb 86 (manuscript received 13 Aug 84) pp 5-10

[Article by T. G. Korzhenevskaya, Ye. S. Lobakova, A. D. Sizov, R. G. Butenko and M. V. Gusev, Department of Biology, Moscow State University imeni M. V. Lomonosov]

[Abstract] Physical-chemical factors of the medium were studied during formation and subcultivation of ginseng and cyanobacterium *C. fritschii* associated cell culture. Cultivators permitting continuous registration of pO_2 and pH were used because the cultivated cells varied considerably in their properties and single measurements at certain specific time periods could miss important data points. During this formation and subcultivation process of mixed cell culture carried out in light on a medium with low saccharose content, cyclic variations of pH and pO_2 were observed which did not occur with corresponding monocultures. These data agree with the dynamics of the relationship between live and dead ginseng cells, growth of the biomass and the degree of contact between the components of this system. Cyclic variations of these parameters reflect cyclicity and asynchrony in development of each component of the association which favor one component but are detrimental to the other. Figures 3; references 11: 6 Russian, 5 Western.

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CSO: 1840/378

UDC 576.8

KINETIC PARAMETERS OF GROWTH OF SOME PROSTHECOBACTERIA

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA in Russian
No 1, Jan-Feb 86 (manuscript received 3 Dec 84) pp 131-134

[Article by A. M. Semenov, L. V. Vasilyeva and S. D. Varfolomeyev, Institute of Microbiology, USSR Academy of Sciences, Moscow]

[Abstract] Growth kinetics of three representatives of oligotrophic prostheco-bacteria were investigated on *Labrys monahos*, *Prosthecomicrobium hirschii* strain 22 and *Stella vacuolata* cells. Analysis of growth kinetics curves was done on a computer, their maximum growth rate was calculated and the change of specific growth rate was determined as a function of the substrate concentration in the medium. In general, these bacteria showed rather low growth rates. They reached their maximum growth rates at a very low concentration of the substrate in media and did not react to further increase in substrate concentration. These results show that it is possible to add kinetic criteria of their growth to the characterization of oligotrophs. The bacteria studied could be arranged in the following order with respect to their degree of increasing oligotrophy; *Stella*>*Prosthecomicrobium*>*Labrys*. Figure 1; references 12: 10 Russian, 2 Western.

7813/12955
CSO: 1840/378

ADVANCES IN MEDICAL ENGINEERING

Moscow GRAZHDANSKAYA AVIATSIYA in Russian No 1, Jan 86 pp 38-39

[Interview with Professor B. I. Leonov, doctor of engineering sciences, director of All-Union Institute of Research and Testing of Medical Equipment, USSR Ministry of Health, "Help for the Aviation Physician"]

[Text] Professor B. I. Leonov, doctor of engineering sciences, director of the All-Union Institute of Research and Testing of Medical Equipment, USSR Ministry of Health, tells our correspondent, I. Goldin about the equipment available to modern medicine and the possibility of improving efficiency of aviation physicians.

[Question] Boris Ivanovich, physicians have long dreamed of a portable diagnostic complex (about the size of a briefcase). How soon will this dream come true?

[Answer] As for an experimental model, such a complex has already been developed. And it has the name of "Aviation physician's instrument." This is a graphic example of the achievements of socialist integration, collaboration of CEMA member nations. The developers of this instrument are specialists from our institute and the Medikor Hungarian association, and they have tried to develop a design that would meet worldwide standards. It combines in a single unit devices for measuring blood pressure, pulse and body temperature. The instrument is portable, so that it can be used under any conditions, even at field airports.

Soon such instruments will begin to come off the plant conveyer by the thousands and will be delivered to "arm" aviation medicine.

[Question] A stationary diagnostic unit, the Pilot, which was developed by specialists in Leningrad, was demonstrated at the All-Union "Labor Safety" Exhibit. Judging by its dimensions, it has rather vast functional capabilities.

[Answer] Unquestionably, they are greater than those of the "Aviation physician's instrument." The Pilot is intended for medical centers of rather large airports where many fliers undergo examinations. One of its substantial advantages is that it has a sizable electronic memory,

which stores base data on each subject. If there are deviations from normal during measurement of some psychophysiological parameters, an automatic signal appears. All measurement data are recorded by a special printer. I would also mention the feasibility of automatic analysis of electrocardiograms and presence of a unit that is specific to the flying profession. I am referring to the device that simulates control of spatial position of an aircraft. With it, the pilot demonstrates not only his visual and motor reactions, but attention, which reflects his professional qualities and is one of the indicators of reliability.

[Question] How does the Pilot recognize its patients?

[Answer] Very simply. Each subject has his own "image" that can be identified by the unit. It is a special personal token that is coded with perforations. The flier inserts it in the instrument slot and all measurements are compared only to his own personal base data, and for printing, the patient's number is punched before the column of medical data.

The diagnostic equipment not only reduces the time required for medical monitoring, improves its reliability, but facilitates considerably the working conditions of medical personnel.

[Question] Apparently, these units will help expand significantly the capabilities of medical centers with respect to implementation of the program for universal dispensary care of the people of our country outlined by the party.

[Answer] Development of equipment for setting up dispensary rolls is a pressing and important task, and specialists of many ministries and agencies are working on it at the present time. And, of course, the models of aviation medical equipment will not, by any means, remain solely in the hands of aviation. This applies, incidentally, to instruments referable to other areas of our endeavors also. There is a specially formed Coordinating Center for Development of Medical Equipment of CEMA Member Nations that takes care of this. Let me mention that, historically, it is expressly at the request of aviation that sophisticated medical and psychological methods and equipment for monitoring were conceived. Let us recall that engineering psychology also owes its existence to aviation.

Of course, the same "aviation physician's instrument" can solve problems of prerun diagnoses on motor vehicle drivers, train engineers, captains of sea and river ships, and it can also become a loyal aid to the physician at the stage of primary preventive screenings which, as we know, are the first step of dispensary care. With such an instrument, it is easy to reach both a distant grazing field and oilmen's settlement.

[Question] Flying is one of the professions that require regular medical certification. Then lengthy laboratory tests are needed. Can the equipment solve this problem too?

[Answer] It is remarkable that robots, which are assimilating industrial production on a broad scale, have also arrived in medicine. Their progressive

procession is beginning here with automation of laboratory tests. Robots can make numerous analysis of the body's biological media within seconds and they can disclose to the physician the signs of disease long before its usual manifestation. And only microdoses of tested substances are used. This means that it is a thing of the past to draw blood from a vein, since a few drops taken from a finger are sufficient for demonstration of many biochemical constituents.

[Question] Indeed, the syringe and also the dentist's chair are probably the pair that frighten patients the most. Can today's progress in medical engineering finally rid us of painful sensations?

[Answer] Analgesia is a medical problem, in the solution of which engineering is also trying to have its say, and to do so with confidence and impact. I am referring to the electroanalgesia machines. Analgesia is obtained by delivering weak current of a specific frequency, analogously to the machines used extensively in physiotherapy. We have already made considerable strides in obstetrics, stomatology, traumatology and other branches of medicine. As for the syringe, the very name of a new instrument, needleless injector, answers your question. The source of pain, the needle, has disappeared. Air under high pressure delivers drugs or vaccines in an ultrafine stream. It traverses the integument almost painlessly.

Equipment for painless interventions has already been developed for dental offices. Cold removes the pain: the diseased part of a tooth is removed with liquid nitrogen, rather than the traditional drill. Incidentally, cryogenic medical equipment is used extensively in different branches of medicine--oncology, surgery, urology, gynecology and ophthalmology.

[Question] Chest roentgenoscopies are needed in preventive check-ups and many other cases. Apparently, "scoping" equipment is also being improved?

[Answer] At the present time, x-rays have some worthy competition. I am referring, first of all, to ultrasound. It permits more graphic examination on a screen of the condition of soft tissues, determination of the distance to the involved part of some organ or other. Incidentally, the Doppler radar method, which is well-known in aviation for determination of traffic speed, is being used with success in ultrasonic diagnostics, for example, to measure the rate of oscillation of cardiac walls and valves. The general press has reported extensively on the capabilities of infrared imagers, which are instruments to record the thermal radiation of biological objects, in particular, heat fields of the integument. Imagers are used as ancillary aids to demonstrate inflammatory processes, impaired venous blood flow and other deviations that are reflected by changes in temperature of different parts of the integument.

Incidentally, fluoroscopy itself has entered its second youth. Let us recall the former x-ray laboratory: total darkness, mysteriously flashing screen.... New equipment has made it possible to literally "shed light." Thanks to an amplifier, the image can be observed in a lit room, on a screen similar to a television screen. At the same time, there is decline in level of radiation exposure for the physician and patient.

[Question] Boris Ivanovich, if you were to single out the main items of medical equipment as of today, which would you put in first place?

[Answer] I think it is computers. Computer engineering has brought progress to all areas, and with its arrival in medicine, there has been qualitative and quantitative change in diagnostic and therapeutic methods. Computers have not only taken on the job of remembering the results of laboratory tests. On their basis, complexes have been constructed for intensive therapy and long-term observation of patients. As shown by the experience in Latvia, automated systems of dispensary care of the public, in which computer complexes are the "brain center," must find worthy application.

[Question] And how is "home" medical equipment developing? Judging by the unchanged glass thermometer, it does not have time to go in step with technological progress.

[Answer] The IAD-1 electronic blood pressure measuring device has appeared for sale. The cuff contains a special sensor which, when the bulb is pumped, presses upon an artery and then sends a signal to the electronic unit. The instrument is small and does not cost much. As yet, the mercury thermometer has not, indeed, given up its rights. But this must definitely happen soon, for it is not convenient. There are more sophisticated semiconductor sensors with pointer-equipped or digital displays. Although such miniature electrothermometers are being furnished only to medical institutions for the time being, they will soon become available for the home as well. I should also like to mention the pocket heart rate monitor. It too is based on electrons, it is produced in series and designed for individual monitoring of heart function during therapeutic physical culture and sports activities.

[Question] In conclusion, I should like to hear about the very latest instrument, the one that has not had time to cool off, as they say, after completion of trials.

[Answer] I could talk about many things. For example, the resuscitation pressure chambers that save people's lives in the most critical situations. Or the large cardiological complexes with built-in computers. But, I guess I will refer to equipment that Hippocrates had already used. For a long time, it appeared that tweezers, scalpels, clamps and other surgical instruments would never change. They appeared, so to speak, to have been overlooked by technological progress. But here too, a breakthrough has occurred. Aviation is to be credited, or more precisely aviation metallurgy. Very recently, a joint project was completed with the Moscow Institute of Civil Aviation Engineers. As a result, it was possible to use the method of diffuse chrome-plating in the manufacture of traditional instruments. The idea of flyers to apply the coating by heating in an airfree environment yielded an amazing result. They did not produce an unstable film, but sturdy nonrusting coating that penetrates deep into metal. It was thus possible to develop new instruments that are technologically feasible and inexpensive. Incidentally, this is a rather typical example of the beneficial influence of scientific and technological progress in aviation on development of sectors that are seemingly quite remote from aviation.

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CSO: 1840/345

MILITARY MEDICAL ACCOMPLISHMENTS AT SEA

Moscow KRASNAYA ZVEZDA in Russian 12 Oct 85 p 6

[Article by V. Verbitskiy, captain third class, Baltic Fleet]

[Abstract] The article describes an appendectomy aboard ship in stormy weather, along with a sketch on developments in medicine on naval vessels in the preceding 20 years that prepared the way for current operations. Lieutenant Colonel (medical service) M. Sorin directs emergency operations, supervision of health on the ship and reports concerning naval medical operations. Other members of the young medical staff have had experience with severe injuries at sea, and are preparing for the appendectomy under general anesthetic, while the helmsman strives to keep the ship's motions as regular as possible. The operation is successful, and when the fleet flagship arrives in its home port 6 days later, the sailor who had been operated on is standing on deck ready to return to his own vessel.

12131/12955
CSO: 1840/330

MOLECULAR BIOLOGY

NEW MOLECULAR BIOLOGY AND BIOPHYSICS INSTITUTE IN GEORGIA

Riga SOVETSKAYA LATVIYA in Russian 9 Jan 86 p 1

[Text] The biography of the Georgian Academy of Sciences' Institute of Molecular Biology and Biophysics began yesterday.

The personnel of this new institute of the republic academy will work on some of the most timely problems of contemporary science. After all, it is not without reason that the 20th century has been called not only the atomic and space age, but also the age of molecular biology.

The new institute's program was predetermined by results of research by associates of the Institute of Physiology's biophysics sector, within the facilities of which the new institute was created.

FTD/SNAP
/12955
CSO: 1840/382

UDC 593.71;576.2;577.3

EFFECT OF CONSTANT MAGNETIC FIELD ON MORPHOGENESIS RATE OF HYDROID CLAVA
MULTICORNIS (FORSKAL)

Moscow ZHURNAL OBSHCHEY KHMII in Russian Vol 46, No 5, Sep-Oct 85
(manuscript received 22 Dec 83) pp 686-690

[Article by A. G. Karlsen and V. M. Aristrakhov, Institute of Chemical Physics,
USSR Academy of Sciences, Moscow]

[Abstract] Colonial hydroids are widely used in studies of the effect of physical and chemical factors on organisms. The morphofunctional state of *Clava multicornis* (Forskal) hydroid colony was investigated under different water temperatures and varying magnetic induction of a constant magnetic field (CMF). The exposition lasted two hours, the magnetic induction was 10, 20 and 40 mT and the temperature 18.5°C. Exposure to 10 mT CMF resulted in earlier reproduction and greater rate of the formation of zooides than exposure to 40 mT CMF. Experiments with 20 mT CMF gave intermediate results. Figure 1; references 9: 7 Russian, 2 Western.

7813/12955
CSO: 1840/416

UDC 615.214.3:547:745.3].038

PEPTIDE ANALOGS OF PYRACETAM AS PUTATIVE NOOTROPIC RECEPTOR LIGANDS

Moscow KHMIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 11, Nov 85
(manuscript received 18 Jul 85) pp 1322-1329

[Article by T. A. Gudasheva, R. U. Ostrovskaya, S. S. Trofimov, M. Yu. Kosoy, F. V. Ienkina, Yu. V. Burov and A. P. Skoldinov, Institute of Pharmacology, USSR Academy of Medical Sciences, Moscow]

[Abstract] Pyracetam or N-carbamidomethyl butyrolactam (I) is the first known nootrop, a new class of psychotropic compounds, stimulating the higher integrative functions of the brain such as thinking, attention and memory. It is used in medicine to improve intellectual-memory functions in retarded children and to reduce the severity of senility. The authors assumed that there are specific nootropic pyracetam receptors in the central nervous system and searched for endogenous ligands with similar structure and functions. A number of compounds were synthesized with structures intermediate between I and oligopeptide derivatives of pyroglutamic acid and their nootropic activity was studied. None of the compounds studied influenced motor activity. The data obtained allow some preliminary suggestions concerning the structure of the bonding center of the nootropic receptor ligand; it probably has pyrrolidine ring bonding sectors and a carbimide group, either a carbimide group in position 5 or an acetamide group in position 1 of the ring. The data prove the presence of specific nootropic receptors in the CNS. Figures 2; references 25: 9 Russian, 16 Western.

6508/12955
CSO: 1840/259

UDC 615.281:547.512].012.1

SYNTHESIS AND BIOLOGICAL ACTIVITY OF GEM-DICHLOROCYCLOPROPYL ESTERS

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 11,
Nov 85 (manuscript received 26 Nov 84) pp 1330-1335

[Article by S. M. Shostakovskiy, V. N. Mochalov and G. M. Larionov, All-Union
Scientific Research Institute of Organic Synthesis, Moscow]

[Abstract] Halogen-containing cyclopropanes have high biological activity, but the studies of their effects on microorganisms have been fragmentary. In order to study the antimicrobial activity of a number of oxygen-containing cyclopropane derivatives, the authors synthesized ethylene glycol bis-gem-dichlorocyclopropyl ester (I) meso-(II) and d,l-(III) forms of the bis-gem-dichlorocyclopropyl ester, as well as the gem-dichlorocyclopropyl esters (IV-XI) by attachment of dichlorocarbene to the corresponding unsaturated compounds. The effects of the compounds on bacteria and pathogenic fungi were studied by serial dilutions with 100,000 microbe cells per ml of liquid nutrient medium. The minimum bactericidal and fungicidal concentrations were determined in the same manner. The general effects of I-III and IX on laboratory animals (guinea pigs and mice) was evaluated by intraperitoneal and subcutaneous administration. Compounds II and III were much more active than IX. Eighteen passages of microbe cultures exposed to 70% of the minimum bactericidal concentrations revealed no development of resistance. All of the compounds caused irreversible denaturation of native gamma globulin but did not interact with denatured protein in nutrient media. The substances have a broad spectrum of bactericidal activity including four antibiotic-resistant strains. References 15: 12 Russian, 3 Western.

6508/12955
CSO: 1840/259

UDC 557.123:547.241].012.1

SYNTHESIS OF POTENTIAL MEDICATIONS BASED ON HYDROPHOSPHORYL COMPOUNDS. PART 6. SYNTHESIS AND ANTIVIRAL ACTIVITY OF UNSATURATED ORGANOPHOSPHORUS DERIVATIVES OF INOSINEDIALDEHYDE

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 11, Nov 85
(manuscript received 2 Nov 84) pp 1340-1347

[Article by V. I. Yudevich, M. A. Shneyder, V. V. Belakhov, Ye. V. Komarov, B. I. Ionin, T. I. Antonova, A. K. Brel and V. B. Lebedev, All-Union Scientific Research and Technological Institute of Antibiotics and Enzymes used in medicines, Leningrad]

[Abstract] The search for new antiviral preparations is continuing among phosphorus-containing nucleosides which can be obtained from hypophosphites. This article undertakes interaction of propadiene phosphorous acid and inosinedialdehyde in the presence of primary amines, forming inosinedialdehyde-9-[1',4'-morpholyl-3'-oxy-N' -alkyl (cycloalkanyl, heteryl)-5'-propadiene phosphinate-6'-oxymethyl-2'] hypoxanthine, in which the carbohydrate fragment is transformed to a morpholine ring containing an unsaturated phosphinate group at position C'5 and primary amine groups in position N'4. Spectral and chemical methods are used to prove the chemical structure of the compounds produced. The antiviral activity of the phosphorylated derivatives of inosinedialdehyde produced was studied with the oncogenic Rous sarcoma virus and infectious viruses, using both therapeutic and prophylactic regimens. The derivatives were found to have antiviral activity for RNA- and DNA-containing infectious and oncogenic viruses. Figures 2; references 14: 7 Russian, 7 Western.

6508/12955
CSO: 1840/259

UDC 615.281:[546.56'131+547.794.3

ANTIMICROBIAL ACTIVITY OF BENZO-2,1,3-THIA- AND SELENADIAZOLES AND THEIR COMPLEX COMPOUNDS WITH COPPER (2+) CHLORIDE

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 11, Nov 85
(manuscript received 11 Sep 84) pp 1348-1351

[Article by E. A. Bezzubets, Ye. K. Dyachenko, N. G. Tikhomirova, N. A. Ostapkevich, Ye. T. Mordvinova, E. G. Gromova and V. V. Lisin, Leningrad Chemical-Pharmaceutical Institute; All-Union Scientific Research Institute of Influenza, USSR Ministry of Health, Leningrad]

[Abstract] A study was made of the antimicrobial properties of CuCl_2 complexes with benzo-2, 1,3,-thia- and selenadiazole derivatives. The antimicrobial activity of the compounds was tested in vitro against *Staph. aureus*, *E. coli* and *Candida albicans*. The hydroxy derivatives of benzo-2,1,3-thia- and selenadiazoles and two complex compounds were found to be most active. The complex compounds of CuCl_2 with hydroxy-, nitro- and amino derivatives of benzo-2,1,3-thia- and selenadiazoles were found to have a broad spectrum of antimicrobial action against *Staph. aureus*, *E. coli*, *Candida albicans*, *Trichophyton gypseum*, *Saccharomyces cerevisiae* and *Mycoplasma pneumoniae*. References 12: 11 Russian, 1 Western.

6508/12955
CSO: 1840/259

UDC 615.281:547.821.411'497]:[546.742+546.732+546.562+546.47

COORDINATION COMPOUNDS OF CERTAIN 3D-ELEMENTS WITH N³-PHENYLBENZO AND N³-PHENYLPICOLINAMIDERAZONES AND THEIR ANTIMICROBIAL ACTIVITY

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 11, Nov 85
(manuscript received 28 Nov 84) pp 1352-1356

[Article by N. M. Samus, A. D. Toleva, A. N. Shishkov, E. N. Shlyakhov, T. A. Burdenko, T. S. Chika and V. I. Tsapkov, Kishinev University imeni V. I. Lenin; Kishinev Medical Institute]

[Abstract] Previous works have found that certain amiderazones have antimicrobial activity. In this work, the authors synthesized coordination compounds of such 3d elements as nickel (II), cobalt (II), copper (II) and zinc with N³-phenylbenzo-(Ia) and N³-phenylpicolino(Ib) amiderazones to establish their composition, structure, and determine the influence of the nature of the complex former and acid group on bacteriostatic activity. Test microbes used were four standard strains of *Staphylococcus aureus*, *Bacillus cereus*, *Bacillus anthracis* and *Escherichia coli*. The nature of the amiderzone is found to influence bacteriostatic activity: Ia and its coordination compounds inhibit the growth of microorganisms at lower doses than the other compounds. The coordination compounds with Ia are also more active than the ligand itself. In most cases the nature of the biometal does not influence the bacteriostatic activity of the compounds synthesized, but replacement of the central ion with zinc in one compound increases the minimum inhibiting does for *Staphylococcus aureus*. References 9: 8 Russian, 1 Western.

6508/12955
CSO: 1840/259

UDC 547.818.241.362/365+577.391

RADIOMODIFYING EFFECTIVENESS OF CIS-2,6-DIPHENYLTETRAHYDROTHIOPYRANE-4-ONE
DERIVATIVES

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 11, Nov 85
(manuscript received 10 May 84) pp 1361-1364

[Article by D. K. Kiyashev, D. T. Musabekov and B. D. Abiyurov, Kazakh
Scientific Research Institute of Oncology and Radiology, Kazakh SSR Ministry of
Health, Alma-Ata]

[Abstract] The authors synthesized cis-2,6-diphenyltetrahydro-thiopyrane-4-one derivatives and studied their radiomodifying activity. The compounds are colorless crystalline substances with high melting point, insoluble in water, soluble in organic solvents. The compounds were tested for their radiomodifying activity upon exposure of white mice to the minimum absolutely-lethal dose of x-rays. Of the compounds studied, cis-2,6-diphenyl-4-ethinyl tetrahydrothiopyrane-4-ol and its sulfoxide derivative had a clear radiomodifying effect, increasing survival rate by 10-20%, or 30-36% when administered before radiation. References 5 (Russian).

6508/12955
CSO: 1840/259

UDC 615.322:582.715].015.4:612.8

STUDY OF NEUROTROPIC ACTIVITY OF NEW SUBSTANCES ISOLATED FROM RHODIOLA ROSEA

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 11, Nov 85
(manuscript received 17 Dec 84) pp 1364-1371

[Article by S. Ya. Sokolov, V. M. Ivashin, G. G. Zapesochnaya, V. A. Kurkin, and A. N. Shchavlinsky, All-Union Scientific Research Institute of Medicinal Plants, Moscow Oblast]

[Abstract] Rhodiola rosea has been used for some time, its liquid extract employed in medical practice as a stimulant and adaptogen. The biologically-active substances in this preparation are phenol compounds, salidroside and thyrosol. A comparative pharmacologic study of salidroside and all the major chemical components of the extract was undertaken in order to determine any new biologically-active substances in the preparation. The neurotropic activity of the substances was evaluated based on the degree of reduction in duration of sleep caused by hexanal, chloral hydrate, and barbital sodium in mice and the potentiation of convulsive and lethal effects of strychnine and coryzal. It was found that the substances extracted reduced the duration of chloral hydrate sleep in the following sequence: salidroside by 37%, 8-lignoside and rhosarine by 27%, rhosine by 25%, rhosavine by 22%, rhosiridine by 22%. Salidroside, rhosavine and alginoside potentiated the convulsive effect of strychnine by 75, 63, and 63%, rhosine and rhosarine by 38%, rhosiridine by 26%. References 12: 11 Russian, 1 Western.

6508/12955
CSO: 1840/259

UDC 613.632.4-074

TOXICOLOGY DATA FOR WORK ENVIRONMENTAL AIR TLV'S FOR TETRAHYDROPHthalic
ANHYDRIDE, TETRAHYDROPHthalamide AND HYDROXYMETHYLtetraHYDROPHthalamide

Moscow GIGIYENA TRUDA I PROFESSIONALNYYE ZABOLEVANIYA in Russian No 12, Dec 85
(manuscript received 23 Apr 84) pp 37-38

[Article by A. I. Gurova, N. Ya. Smolyar, N. A. Drozhzhina and I. N. Zasorina,
People's Friendship University imeni Patrice Lumumba, Moscow]

[Abstract] Human and animal toxicity studies were conducted on tetrahydrophthalic anhydride, tetrahydrophthalamide and hydroxymethyltetrahydrophthalamide in order to establish threshold limit values (TLV's) for the air in working environments. The studies encompassed determination of LD₅₀ values in various species, assessment of skin and mucous membrane irritability in animals and human volunteers, and evaluation of autopsy findings in experimental animals. Considering the late effects of exposure and factoring-in a 10-fold safety margin, the TLV for these compounds was set at 0.7 mg/m³, placing these agents into Class II category in terms of toxicity. References 10 (Russian).

12172/12955
CSO: 1840/373

UDC 615.849.1.015.25:547.752].07

RADIOPROTECTIVE PROPERTIES OF 3-MERCAPTOINDOLE DERIVATIVES

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 8, Aug 85
(manuscript received 13 Sep 84) pp 976-978

[Article by G. G. Skvortsova, B. V. Trzhtsinskaya, L. F. Teterina and V. S. Korytny, Irkutsk Institute of Organic Chemistry, Siberian Department, USSR Academy of Sciences]

[Abstract] The authors previously used 3-mercptoindole (I) to synthesize a number of substituted indoles with various positions of alkyl and vinyl groups at the nitrogen and sulfur hetero atoms and attached EtSH at both vinyl groups of one of the compounds synthesized to form a trisulfide. In this work BuSH is attached to vinyl indoles to obtain 3 new sulfides. Experiments using the new compounds were performed on mice irradiated with gamma irradiation at the LD₉₅. The substances were introduced i/v 15 minutes before irradiation. None of the compounds tested are soluble in water, and therefore they were administered as an aqueous emulsion with Tween-80 at 0-2 ml per mouse. Vinyl thioindole II had the greatest antitumor activity, achieving survival of 66% of the irradiated animals as opposed to 100% death in the control group. Diethylthioindole VI had less activity (30.6% survival), changing the length of the thioalkyl radical did not change the radioprotective properties. Both compounds of this type achieved survivals of 26%, less than in two products with one thiylated vinyl group (6.6 at 6%). References 6: 4 Russian, 2 Western.

6508/12955
CSO: 1840/258

UDC 615.917:547.261].036.11.085:615.246.9

DETOXIFYING EFFECT OF POLYVINYL PYRROLIDONE DURING ACUTE METHANOL POISONING

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 8, Aug 85
(manuscript received 9 Apr 84) pp 974-976

[Article by V. D. Zazhirei, Ye. P. Melnikova, T. M. Karaputadze, G. T. Chernenko and Yu. E. Kirsh, All-Union Scientific Research Institute of Technology of Blood Substitutes and Hormonal Preparations, Moscow]

[Abstract] An attempt was made to study the detoxifying effect of polyvinyl-pyrrolidone (PVP) on a model of poisoning of animals by methyl alcohol. PVP specimens with molecular wt. 4500, 8000, 15,000 and 46,000 were used to prepare 6% aqueous salt solutions, then sterilized in a autoclave at 110°C for 45 minutes. Methyl alcohol was administered intraperitoneally to white mice, body mass 20-30 g, at 0.1-0.2 ml per animal. After 5 minutes, PVP therapy was begun by administration of 1 ml of the solution intravenously in portions. The animals were observed for 7 days. The detoxifying effect was found to vary directly with molecular wt. of the PVP. Intraperitoneal administration of PVP was found to be less effective than i/v administration. A solution with methyl pyrrolidone had no detoxifying effect and even increased the toxic effect of the methanol. Since the metabolic products of methyl alcohol do not interact in water with PVP, the mechanism of the detoxifying effect cannot be explained by possible complex formation of this type of toxic substance with PVP. Figures 2; references 2 (Russian).

6508/12955
CSO: 1840/258

UDC 615.355:577.152.311].012.1

SYNTHESIS AND ANTICHOLINESTERASE ACTIVITY OF FLUOROCHLORONITROACETIC ACID ESTERS

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 8, Aug 85
(manuscript received 22 Aug 84) pp 968-971

[Article by Yu. Ya. Ivanov, V. K. Brel, L. V. Postnova and I. V. Martynov,
Institute of Physiologically Active Substances, USSR Academy of Sciences,
Moscow Oblast]

[Abstract] Fluorochloronitroacetic acid esters $O\text{NCClFCOOR}$ were synthesized in order to seek new physiologically active substances: R=Me (Ia), Et (Ib), Pr (Ic), Bu (Id), Am (Ie), C_6H_{13} (If), C_7H_{15} (Ig), C_8H_{17} (Ih), C_9H_{19} (Ii), $C_{10}H_{21}$ (Ij). It was assumed that a relationship would be found between the chemical structure of the esters and their activity. The acute toxicity of the compounds was determined on male mice by 1-time intragastric administration dissolved in vegetable oil. Esters Ib and Ic caused muscular weakness and convulsions. Compounds Ia-d at 0.5-2.0 mM concentration acting on an isolated tissue preparation caused increased strength of muscular contraction in response to individual weak electrical pulses, followed by blockage of conductivity of frequent pulses, the nervous-muscular block continuing for some time after washing the ester away. The reason for the block was apparently inactivation of synaptic acetyl cholinesterase. The effectiveness of the esters depends significantly on length of alkyl radical. Ib and Id are more than two orders of magnitude more active than Ia and Ih. The mechanism of inhibition of ACE is apparently acylation of the serine hydroxyl of the esterase center of these enzymes. A nucleophilic reagent restores their activity. References 5: 4 Russian, 1 Western.

6508/12955
CSO: 1840/258

UDC 615.214.012.1.074

SYNTHESIS AND PHARMACOLOGIC PROPERTIES OF 4,9-DIAMINODERIVATIVES OF 7,8-DIHYDRO-1,3-DIAZAPHENTHIAZENE

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 8, Aug 85
(manuscript received 8 Oct 84) pp 964-968

[Article by M. P. Nemeryuk, L. A. Tolokontseva, M. V. Pukhova, A. I. Polezhayeva, L. F. Roshchina, R. D. Suvayev, T. S. Safonova and M. D. Mashkovskiy, All-Union Scientific Research Chemical-Pharmaceutical Institute imeni S. Ordzhonikidze, Moscow]

[Abstract] Continuing their works on synthesis and study of the biological properties of 1,3-diazaphenthiazenes, particularly their 7,8-dihydroderivatives, the authors obtained new 4,9-diamino substituted compounds in the system containing molecules of various combinations of substituents at positions 4 and 9, including a primary amino group, for an amino group substituted with alkyl- ω -carboxyalkyl, benzyl or cyclohexyl radical (Ia-f, IIa-e, IIIa-d, IVa-h). The compounds were studied according to their influence on central adrenergic dopaminergic and serotonergic systems. The influence of the compounds on the hypnotic properties of hexenal, anti-inflammatory, analgesic, antipyretic and antihypoxic activity was also studied. The LD₅₀ was determined on white mice. Compounds were found having neurotropic, analgesic, anti-inflammatory and antihypoxic activity. The compounds were less active than previously known preparations with the same effects. References 7: 4 Russian, 3 Western.

6508/12955
CSO: 1840/258

UDC 615.23:547.756].07

ANTIHYPOXIC EFFECT OF DIOXINDOLE DERIVATIVES

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 8, Aug 85
(manuscript received 3 Oct 84) pp 960-964

[Article by L. Y. Mazhilis, V. N. Garalene, A. P. Stankavichus and S. P. Risyalis, Scientific Research Institute of Physiology and Pathology of the Cardiovascular System imeni Z. Yanushkyavichyus, Kaunas Medical Institute]

[Abstract] A study was made of the antihypoxic properties of dioxindole derivatives occupying an intermediate position between compounds of the oxindole and isatine series. The structures of the compounds obtained were confirmed by PMR spectra and elemental analysis. The dioxindoles were found to have antihypoxic activity. Furthermore, considering their water solubility and toxicity, their use as antihypoxants may be preferred. In the experiments, gradual reduction of atmospheric pressure to 19.4 KPa was used to induce hypoxia in male rats. Antihypoxic preparations were administered i/v 45 minutes before the animals were placed in the low-pressure chamber. The criterion of antihypoxic activity was the percentage of survival of the animals and duration of life of those which died. References 8: 6 Russian, 2 Western.

6508/12955

CSO: 1840/258

UDC 615.277.3.033.015.4.07

IONOL: DISTRIBUTION IN BODY, METABOLISM AND BIOLOGICAL EFFECTS. PART 1.
DISTRIBUTION IN BODY AND METABOLISM (LITERATURE REVIEW)

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 8, Aug 85
(manuscript received 10 Nov 84) pp 910-919

[Article by I. A. Degterev and G. Ye. Zaikov, Institute of Chemical Physics,
USSR Academy of Sciences, Moscow]

[Abstract] Ionol (2,6-di-tert-butyl-4-methylphenol), also known as dibunol, can be used in the treatment of cardiovascular, gastrointestinal and skin diseases, periodontosis, diseases of the eyes, and in prophylaxis of senility. It is widely used in several countries as an antioxidant additive to food products containing fats and oils and in the production of food packaging, and as an additive to feeds for chickens and fish. The average American consumes about 2 mg of the preparation per day as food additives. The metabolism of ionol both *in vitro* and *in vivo* is described and further biotransformations of the metabolites of ionol are discussed. The most important result of analysis of the experimental data presented in this portion of this review is the determination of the transformation of ionol in the organism, leading to the formation of a number of chemically active compounds. References 52: 19 Russian, 33 Western.

6508/12955
CSO: 1840/258

UDC 615.217.24:547.82

SEARCH FOR β -ADRENOBLOCKERS AMONG DERIVATIVES OF 2-(2'-HYDROXY-3'-ISOPROPYLAMINOPROPOXY)-3-CYANO-4-AMINOPYRIDINES

Moscow KHMIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 8, Aug 85
(manuscript received 22 Nov 84) pp 947-952

[Article by V. A. Azimov, V. G. Granik, S. I. Grizik, L. V. Yershov, N. I. Smetskaya, S. D. Yuzhakov, M. D. Mashkovsky and L. N. Yakhontov, All-Union Scientific Research Chemical-Pharmaceutical Institute imeni S. Ordzhonikidze, Moscow]

[Abstract] Other authors have reported an increase in the β -adrenoblocking effect by combining it with vasodilation and hypotensive properties by introducing 3-isopropylamino-2-hydroxy-propoxy groups plus cyano substituents to benzene, pyridine or indole rings. This approach stimulated the authors to perform similar studies among the 6(2'-hydroxy-3'-isopropylaminopropoxy)-7-cyano-5-azaindoline hydrochlorides (I) with various substituents at the nitrogen of the 5-membered ring. It was found that M-methyl and N-benzyl derivatives of this series are highly active β - and α -adrenoblockers in experiments in vitro, though less active in experiments in vivo. To produce more active compounds in vivo, substances similar to I with open pyroline ring were synthesized and pharmacologically studied--hydrochlorides of N-substituted 2-(2'-hydroxy-3'-isopropylaminopropoxy)-3-cyano-4-aminopyridines (IIa-h), as well as carbocyclic analogs of active 5-azaindolines of I-hydrochlorides of 2-(2'-hydroxy-3'-isopropylaminopropoxy)-3-cyano-5,6-tri- and tetramethylene pyridines (IIIa,b). In experiments on narcotized male rats, the β -adrenoblocking activity was determined upon i/v administration, determining the EV₅₀ for inhibition of positive chronotropic and depressor effect of isadrine 1 μ g/kg i/v. Acute toxicity was determined in experiments on white mice with i/v administration. Compound IIa with the characteristic chain in position 2, cyano substituent in position 3 and phenylamine group in position 4 of the pyridine ring was found to have β -adrenoblocking activity, but has no advantages over known β -adrenoblockers. Condensation of the substituted pyridine group with 5-member pyridine ring is found not to be a necessary condition for increasing β -adrenoblocking activity. Removal of the amine nitrogen decreases activity. Aryl groups are most interesting as N substituents for this type of compound. References 9: 6 Russian, 3 Western.

6508/12955
CSO: 1840/258

UDC 591.86:578.086.3:591.044.6

CHANGE IN ULTRASTRUCTURE OF MUSCLE FIBERS OF RAT DIAPHRAGM AND DYNAMICS OF REDISTRIBUTION OF INTRACELLULAR CALCIUM UNDER INFLUENCE OF ANTICHOLINESTERASE SUBSTANCE CHLOROPHOS

Leningrad TSITOLOGIYA in Russian Vol 27, No 6, Jun 85 (manuscript received 24 Jan 84) pp 633-638

[Article by N. V. Tomilin, V. G. Kuznetsov, L. G. Kubarskaya and V. F. Mashanskiy, Institute of Toxicology, USSR Ministry of Health; Institute of Cytology, USSR Academy of Sciences, Leningrad]

[Abstract] A study is made of the dynamics of changes in the ultrastructure of rat diaphragm muscle fibers and the related redistribution of intracellular calcium upon exposure to chlorophos, an anticholinesterase substance. Experiments were performed on white rats of both sexes, body mass 150-220 g. An aqueous solution of chlorophos was administered intraperitoneally at 300 mg/kg. The animals were fixed with aldehyde solution by intravascular perfusion under hexenal narcosis 5, 15 and 45 minutes after injection of chlorophos. The studies revealed that administration of chlorophos caused a change in the ultrastructure of muscle fibers similar to that caused by other anticholinesterase substances. The following sequence of morphofunctional changes in muscle fibers was determined: an excess of acetylcholine causes an increase in permeability of the postsynaptic membrane to calcium ions, resulting in a great increase in intracellular calcium concentration in the subsynaptic area and local contraction of the fibers in this area. Propagation of excess calcium through the muscle fiber is blocked by the sarcoplasmic reticulum and the mitochondria. The calcium is first absorbed by elements of the sarcoplasmic reticulum. The decrease in intracellular ATP concentration activates its synthesis. The mitochondria moved from the condensed state to the orthodox state and the content of ATP and calcium in them decreases. As the intracellular calcium concentration continues to rise, the excess calcium begins actively accumulating in the mitochondria. When a certain critical concentration of accumulated calcium is reached in the mitochondria, local vacancies appear in the matrix. At this stage respiration and oxidative phosphorylation are separated. Further increases in calcium concentration cause swelling and fragmentation of the sarcoplasmic reticulum, and vacuolization of the mitochondria. The accumulated calcium is released into the sarcoplasm. This increases the intracellular calcium ion concentration even more and facilitates propagation of damage over the muscle fiber.

Figure 1; references 43: 10 Russian, 33 Western.

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CSO: 1840/1045

PHYSIOLOGY

HYPOBIOSIS AND INDUCED HIBERNATION STUDIES

Moscow MOSCOW NEWS in English No 2, 19-20 Jan 86, p 10

[Text] BETWEEN LIFE AND DEATH. The situation was hopeless. He was dying. No one could help him, considering that the nearest human habitation was dozens or perhaps hundreds of kilometres away. Summoning his last ebbing strength, the man reached for the bag strapped to his belt. With stiff fingers he pulled out the syringe and gave himself an injection.

He was found a month later. The syringe seen on the spot was an indication that there was still a glimmer of life in the cold body. And this turned out to be correct. The rest was a matter of medical techniques...

The above is, of course, just science fiction, but it deals with a method of saving human life which could soon be reality, in a situation where speedy medical intervention is not possible. To slow down life and at the same time the attending catastrophic processes caused by illness or a bad injury, to give doctors the time necessary to give their patient a chance for survival --this already can be hoped for. And the hope lies in unravelling the phenomenon called hypobiosis.

The problem is being solved at the USSR Academy of Medical Sciences, and, in particular, at the laboratory of physiology of hypobiosis led by Nikolai Timofeyev, doctor of medical sciences. The results obtained by the researchers, seem fantastic.

Life Slowed Down 90 Times

"What exactly is hypobiosis?" Our correspondent Svetlana Ivanova asked Dr. Timofeyev.

"Natural hypobiosis is something possessed by many warm-blooded animals. It's what's known as 'dormancy', during which the animals reduce the level of their metabolism to just two-three per cent of what it is normally."

"How did hibernators learn it in the course of evolution? Until quite recently it remained an enigma to scientists, but we seem to have come close to understanding the key mechanisms of this phenomenon, and it is full of great promises for medicine."

What Kind of Promises?

They consist in being able to reduce metabolism for an extended time, to cut down on the organism's oxygen and energy requirements, to reduce the load on the heart, lungs, liver, kidneys and other organs. This, naturally, arrests any disease. This would give doctors more time for giving both first aid or surgery. For example, in bad cases of heart failure death is caused not so much by the damage to the heart as by further complications, primarily by the disruption of the blood flow which develops oxygen deficiency in the organs and tissues. Hypobiosis, in fact, can eliminate oxygen deficiency, drastically reduce the functional load on an impaired heart and the other organs.

According to our research data, only hypobiosis can save life in cases of lethal loss of blood, irreversible shocks and oxygen deficiency incompatible with life, etc. I'm convinced therefore that hypobiosis will take a worthy place in medicine in the coming years. I'd like to stress again that the use of hypobiosis, as a means of conserving life temporarily in extreme cases, opens up tremendous possibilities. No special equipment, no special conditions are required to achieve hypobiosis. Any member of paramedical personnel can make an injection. In their absence, artificial hypobiosis can be effected, if need be, by the patient himself or by anyone else. People working in conditions of the extreme north, deserts, mountain climbers, explorers of caves, polar researchers, etc., would carry the necessary preparations in their first-aid kits.

The technique holds great prospects also for conserving organs and tissues for transplantation...

How Does One Beat Tremor?

[Q] Didn't medics know all that before your research?

They did, of course, but they didn't know what's most important--how to create the state of hypobiosis. There were attempts to achieve it by cooling patients with ice all around them or putting them in cold baths. Similar types of cooling cause intense tremors, cramps and a sharp increase in metabolism. Therefore, to neutralize these reactions, doctors use anesthetics and, at the same time, agents that cause temporary paralysis of muscles--the source of tremors. This necessarily results in a stoppage of breathing and a need to resort to mechanical lungs, etc.

Our approach is new in that our efforts were aimed at achieving hypobiosis without cooling. The results exceeded the boldest expectations: the level of metabolism was cut twice. The animal's bodily temperature dropped to that

of the environment. The most amazing part is that in the process no severe thermoregulation reactions, such as tremors, cramps, etc., typical in a warm-blooded animal, were observed. The animal's temperature only varied with the ambient temperature, as is peculiar to the cold-blooded lizards, frogs, etc.

Our studies of hibernators have revealed that the primary hypermetabolism (twice-reduced metabolism) occurs in them long before they achieve dormant state. In the process they lose thermal regulation and even acquire the ability to live at temperatures close to the freezing point, although they cannot do that during their active periods.

Strange as it is, before our experiments no one seemed to know what exactly caused tremor, one of the basic components that compensates for losses of heat in a warm-blooded organism. Well known, however, were systems sensitive to cold, and even centers in the brain that control thermogenic reactions.

So, What Causes Tremors?

It was found that tremors aren't caused by direct signals from the brain to the muscles, as was earlier believed. They are realized through the sympathetic nervous system whose endings penetrate all the organs and tissues and terminate in special kind of bubbles that contain catecholamines, biologically active substances. In responding to cooling living organisms release catecholamines which indirectly cause muscular tremors. This being the case, could the release of catecholamines be temporarily prevented in order to switch off tremors?

That's exactly what we did. After one or two injections of the substance we had selected, the animal was relieved of tremors and took on the properties of a cold-blooded organism. Its bodily temperature now varied with the ambient temperature.

The experiments showed that with the drop in the ambient temperature, the temperature of the body dropped too, and metabolism grew less intense. While the ambient temperature stayed unchanged, animals remained for many days in a stable state of hypobiosis, with metabolism down to 20-30 percent, and could be transferred to the normal level of vital activity at any moment.

[Q] What type of a "supersubstance" have you found to solve this problem by one or two injections?

There are dozens of substances like that. They are well known in the medical profession. But it never before occurred to anyone to use them to achieve hypobiosis. After we had discovered the tremor mechanism, we knew for certain which substances could switch it off. The task only consisted in selecting the optimal dosage of these substances. Their action can be different. Some can disturb the synthesis of catecholamines, others can misdirect it, still others can block the release of catecholamines from the sympathetic depots--the way chosen by hibernators. Experiments showed that numerous combinations of these substances can be used to achieve hypobiosis with strictly programmed characteristics and at any programmed period of time: either quickly--during 2-3 minutes, or slowly--over a period of 15-20 hours.

They're Cold But Alive

[Q] The processes taking place in a living organism under normal conditions are so attuned to one another that such an abrupt drop in metabolism should necessarily happen at the expense of something. What's the price?

Primary hypometabolism, when metabolism gets reduced by half, costs the organism all kinds of emotional experiences: stress-reactions, motivational behavior. Thermal comfort disappears, cardiac activity slows down, together with breathing, in a word, everything that the sympathetic nervous system tones up and makes life varied and beautiful. But when the price to pay for hypobiosis is a matter of life or death, the price is quite suitable, I think.

-> [Q] If I understand you correctly, when you speak about the practical uses of hypobiosis in medicine in the immediate future, you mainly refer to the possibility of reducing metabolism by 70-80 percent. What about the superdeep hypobiosis when metabolism is reduced by 90 percent or more?

The reduction of metabolism by 90 or more percent gives rise to the problem of cold death in the organism. This happens, as a matter of fact, on the level of cell membranes. We have succeeded in partially reproducing the mechanism which helps hibernators protect the functioning part of the membranes against damages, thus enabling the cellular structures to breathe at temperatures close to the freezing point. But so far it is an uphill task to reproduce experimentally the entire process. By simulating a simplified version of this mechanism, we have succeeded in maintaining vital activity in non-hibernating organisms at temperatures close to the freezing point, with metabolism being 2-3 percent of the normal one. But this so far can be done for very short periods of 20 and 30 minutes. But this is already a breakthrough. Frankly, we sometimes think it a miracle to see a rhythmic operation of the heart in animals that are absolutely cold. We have no delusions: there's much more hard work ahead.

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CSO: 1840/440E

ANTIMUTAGENIC COMPOUNDS FROM PLANTS

Moscow MOSCOW NEWS in English No 3, 26 Jan-2 Feb 86, p 10

[Article by Valeriy Grigoryev after interview with Urkhan Alekperov, professor, director of the Azerbaijan Institute of Botany, corresponding member, AzSSR Academy of Sciences]

[Text] "GASMASK" FOR HEREDITY. Global biospheric pollution impairs the mechanism governing heredity in all living beings. The organism's ability to adapt to the changes of environment is too plastic, too "slow moving" to protect itself against the pressure of such extreme factors that are alien to nature as the negative consequences of urbanization and the scientific and technological revolution.

Of course, mutations, or changes within the hereditary characters in living organisms under the impact of such natural factors (mutagens) as, for example, natural radiation, electromagnetic oscillations, changes in temperature and climate, solar activity, have always existed.

In the past 35-40 years, however, the number of mutagens in the environment has been growing by leaps and bounds, and most are manmade. What I primarily have in mind are power-production wastes, wastes from mining, chemical, pesticides industries, certain items of perfumery and detergents, vast list of medicinal preparations, food additives--everything that forms anthropogenic factors. There is a real threat of disrupting the smooth interaction between living organisms and the environment.

The hereditary mechanism within living organisms needs what could be called a "gas mask" which could filter out undesirable mutations and arrest the "forced evolution" touched off by the biospheric pollution.

The so-called compensation effect developed by us could serve as such a "gas mask".

[Q] What prompted your line of research?

Researchers in the late 1950s discovered chemical compounds that could retard mutations. This phenomenon was called antimutagenesis. I became interested and started to look for and describe antimutagens in the plant world.

The point of departure for our research was the generally known fact: plants, including edible, in the process of evolution formed an ability to synthesize substances whose function is to combat diseases and pests. Among them, for example, are natural pesticides which, by the way, have genotoxic properties.

Why then does food containing genotoxins not harm people? Precisely because, as we have discovered, we, unknowingly, eat it in combination with foods that contain "neutralizers", or, as to use the current word, antimutagens.

To date, researchers have described some 200 antimutagens, 70 of which have been discovered and described for the first time at our institute's laboratory of physiology of mutagenesis. This kind of work was prompted by the idea of lowering the pressure of human economic activity on the genetic apparatus of all living beings, with the aid of natural antimutagens.

[Q] And where are you now in your research?

All the discovered mutagens have been placed into groups according to their characteristics. The mechanism and the nature of their impact on the human organism have been described, the ways how to employ antimutagens were theoretically substantiated and experimentally developed, and their role was deciphered in the stable functioning of genetic systems.

In the laboratory we simulated the extreme risk conditions for heredity created by harmful physical, chemical, energy-related, food-related, and urban groups of mutagens. We also simulated different "mixed environments".

In each of the environments we placed animals and fed them food containing various combinations of antimutagens. In 65 to 70 cases out of 100 genetic pathology was prevented. Our recommendations have already found their way into production. In Czechoslovakia, for example, antimutagen food additives have been introduced in food meant for people producing coal tar. This has cut by half the level of the occupational genetic pathology.

We think that antimutagens should be administered to members of high occupational risk as a cure and preventive measure. Agricultural experts should start work on developing plants with an increased content of antimutagens. At home, people should increase the share of food with antimutagen additives. Pharmacologists should develop a new class of medicines containing antimutagens. Environmental protection experts should produce predictions concerning the stability of biological populations (flora and fauna), including those that are rare or threatened according to their contents of antimutagens.

As regards theory, I'm sure that the compensation method is one of the answers to such a cardinal question of modern biology as control over hereditability

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RADIOTELEMETRY COMPLEX "MALAKHIT" FOR PHYSIOLOGICAL MONITORING

Moscow MEDITSINSKAYA GAZETA in Russian 8 Jan 86 p 2

[Article by N. Borisova, Sverdlovsk]

[Text] The laboratory of medical radioelectronics of the Sverdlovsk Scientific Research Institute of Labor Hygiene and Occupational Diseases has developed and built a radiotelemetry complex for physiological and hygienic studies at enterprises of the metallurgical and machine building industries. The name of the complex is "Malakhit". It consists of two systems. The first records physiological data which characterize heart functions and respiratory parameters. The second system records, by radio, parameters of the microclimate of the workplace. This system also 'collects' data on body temperature and on space beneath clothing. This is very important for physiologists and hygienists. The radius of action of the complex is 100 meters.

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EFFECT OF INITIAL BODILY PARAMETER VALUES ON THEIR CHANGES RESULTING FROM EXTERNAL CAUSES

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA in Russian No 1, Jan-Feb 86 (manuscript received 29 May 83) pp 96-114

[Article by V. I. Kopanov and V. V. Vlasov, Military Medical Academy imeni S. M. Kirov, Leningrad]

[Abstract] Bodily reaction to external actions is determined by the type of action and initial state of the body. There are a number of classifications of bodily state; one of them was developed by Wilder as an empirical-statistical law of initial value (LIV). A review of select studies of LIV is presented concentrating on those with application to physiological studies. The review has covered principal theses and results of negative correlation between the parameter value and its change during action on the body and its relationship to other patterns of the development of reaction to external action. An analysis was presented of various methods for describing the reaction to external action, techniques for estimation of individual reactions and resistance and ways of increasing this resistance. Applicability of LIV is quite broad in analysis of reactivity and resistance. LIV explains individual variations of bodies and characteristics of initial state at the moment of action. Figures 6; references 80: 48 Russian, 32 Western.

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CSO: 1840/378

ARTIFICIAL INTELLIGENCE APPLICATIONS OF BRAIN ASYMMETRY STUDIES

Moscow MOSKOVSKIY KOMSOMOLETS in Russian 17 Jan 86 p 4

[Article by S. Kashnitskiy, interviewer]

[Abstract] This lengthy article is an interview with Yuriy Mikhaylovich Lotman, professor of the chair of Russian literature at Tartu University, who is called a founder of the scientific direction known as semiotics (the study of signs and symbols). Lotman heads the semiotics problem group of the university's laboratory of history and semiotics.

In the interview, Lotman comments on directions of his group's work which have a bearing on the development of artificial intelligence. Particular attention is devoted to studies which the group has been making of relationships and interactions between individual intelligence and collective intelligence expressed in culture, which is viewed as a model of artificial intelligence. A group of scientists from the Institute of Evolutionary Physiology and Biochemistry imeni Sechenov has been taking part in this work. This group, which is headed by V. Deglin, is studying the role of the brain's functional asymmetry in intellectual activity, particularly the perception and production of new information. Constant dialogue between the left and right hemispheres of the brain is believed to be essential to the existence and spontaneous development of human intelligence, Lotman explains. Conditions for the development of artificial intelligence are presumed to be analogous.

Lotman relates that experimental methods have been developed in this connection for the purpose of studying differences in the perception of metaphors and images by the brain's hemispheres. These methods were developed in collaboration with Nikolay Nikolayenko, a young researcher, using patients of his as experimental subjects. One of the hemispheres in the brain of each of these patients had been temporarily deactivated for medical purposes. Experiments were conducted in which the subjects were asked to draw squares. Patients with deactivated hemispheres drew rectangles instead of squares, without realizing that their drawings were incorrect. The main thing that these experiments demonstrated, according to Lotman, was that under normal conditions the two hemispheres carry on a dialogue on both the physiological and the semiotic level, coding individual objects.

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INFLUENCE OF SHIPBOARD ENVIRONMENTAL FACTORS ON CONDITIONED REFLEX ACTIVITY
OF EXPERIMENTAL ANIMALS DURING A LONG VOYAGE

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian Vol 31, No 6, Nov-Dec 85
(manuscript received 5 Jun 84) pp 688-691

[Article by O. Yu. Netudykhatka, A. P. Stoyanov and V. N. Yevstafyev,
Institute of Marine Transport Hygiene, Odessa]

[Abstract] The purpose of this work was to study the influence of environmental factors encountered on board a ship, with predominance of the noise vibration component, on the conditioned reflex activity of experimental animals. Experiments were performed on 120 male Wistar white rats during a 90-day voyage of a freighter. The influence of specific shipboard environmental factors was evaluated on the basis of studies on conditioned motor reflexes involving response to a sound signal which preceded application of a mild electric shock by 5 seconds. The changes in conditioned reflect activity varied with intensity of training and duration of training. Differences in the avoidance reaction were observed in all groups of animals, indicating an increase in the degree of inhibitory processes in the central nervous system as a result of the influence of the unfavorable sanitary-hygienic factors characteristic for the working spaces in ships. Figure 1, references 9: Russian.

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UDC 613.65:658.311.44

VOCATIONAL TESTING FOR OCCUPATIONS DEMANDING HIGHLY PRECISE MOVEMENTS

Moscow GIGIYENA TRUDA I PROFESSIONALNYYE ZABOLEVANIYA in Russian No 1, Jan 86 (manuscript received 6 Dec 84) pp 47-48

[Article by L. N. Zefirov, R. A. Marinovich and S. A. Yegorov, University, Kazan]

[Abstract] Long-term studies were conducted at the Kazan Motor Construction plant to test workers for suitability in burnishing and riveting work required in the aviation industry, and for work as lathe hands and milling machine operators. The former professions, requiring highly precise motor coordination, are noted for high turnovers of the labor force which may approach 70%, while the latter occupations are less demanding of accurate movements and have far lower turnover rates (ca. 30%). A battery of psychological and physiological tests were employed to test worker suitability for either category of employment, encompassing visual-motor reaction times, small object manipulation, attentiveness, movement coordination, etc. On an overall basis, the value of such testing was found to be highly reliable as a predictor of suitability for burnishing (0.80) or riveting (0.70) work. The probability of predicting suitability for lathe or milling machine operation was less impressive (0.39). These observations do indicate, however, that a battery of psychophysiological tests is a valuable adjunct in the selection of workers for jobs requiring fine movements. References 3 (Russian).

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UDC 613.646-055.077

EFFECTS OF COLD EXPOSURE ON THERMAL STATUS OF MEN AND WOMEN

Moscow GIGIYENA TRUDA I PROFESSIONALNYYE ZABOLEVANIYA in Russian No 1, Jan 86
(manuscript received 5 Nov 84) pp 24-28

[Article by R. F. Afanasyeva and R. O. Oganyan, Institute of Labor Hygiene and Occupational Diseases, USSR Academy of Medical Sciences, Moscow]

[Abstract] A comparative study was conducted on 8 men and 9 women between the ages of 20 and 35 years to assess sex differences in thermal comfort perception and objective changes in skin temperature and heat loss on exposure to different environmental temperatures. At $23 \pm 0.2^\circ\text{C}$, a relative humidity of $45 \pm 5\%$, and 0.1 m/sec air current the mean skin temperature in men and women was, respectively, 33.0 ± 0.21 and $32.7 \pm 0.17^\circ\text{C}$. The corresponding rates of heat loss (q) were 50 ± 1.0 and $43 \pm 1.3 \text{ kcal/m}^2\cdot\text{h}$. After 60 min at $19.0 \pm 0.1^\circ\text{C}$ the average skin temperatures of men and women were 31.2 ± 0.30 and $31.1 \pm 0.24^\circ\text{C}$, respectively, with respective q values of 63.1 ± 1.5 and $53.2 \pm 1.2 \text{ kcal/m}^2\cdot\text{h}$. After 60 min at $14.0 \pm 0.1^\circ\text{C}$ the respective temperatures and q values for men and women were 30.6 ± 0.21 and $30.2 \pm 0.20^\circ\text{C}$, and 82.6 ± 1.4 and $67.9 \pm 1.3 \text{ kcal/m}^2\cdot\text{h}$. In conjunction with the objective data that thermoregulation in women relies essentially on physical factors, i. e., decreased skin temperature and diminished body heat loss, women were quicker to perceive thermal discomfort. In men, thermal homeostasis relied preferentially on chemical thermoregulation reflected in greater heat loss. References 5: 2 Russian, 3 Western.

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STUDY OF BRAIN BIOCHEMISTRY DURING HYPOTHERMIA

Kiev KRIOBIOLOGIYA in Russian No 1, 1985 (manuscript received 12 Oct 84)
pp 44-49

[Article by E. E. Emirbekov and S. P. Lvova, Dagestan State University,
Makhachkala]

[Abstract] Aspects of cerebral metabolism in hibernating and non-hibernating animals during hypothermia are discussed and analyzed on the basis of materials in the literature. Existing factual materials on neurochemical changes in the brain due to hypothermia cannot support formulation of a fully developed theory of the effect of cooling on cerebral metabolism. There are many gaps in the area of study of the role of neuro-specific components and their role during hypothermia. A specific concept of the effect of hypothermia on molecular processes in the brain is described briefly. The material presented indicates existence of reserve possibilities of regulatory processes in the central nervous system during hypothermia and opens prospects for extending resistance of warm blooded animals to hypothermia by use of adaptive functions at low body temperatures. References 41: 38 Russian, 3 Western.

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CSO: 1840/320

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SOMATOSENSORY AND AUDITORY PERCEPTION ACCORDING TO STUDY USING FOCUSED
ULTRASOUND

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian Vol 21,
No 6, Nov-Dec 85 (manuscript received 26 Mar 85) pp 591-596

[Article by Ye. M. Tsirulnikov, Institute of Evolutionary Physiology and Bio-
chemistry imeni I. M. Sechenov, USSR Academy of Sciences, Leningrad]

[Abstract] Materials from the literature are used in discussion of some aspects of the interpenetration of physiology and psychology in the area of sensory perception with emphasis on the contribution of studies of somatosensory and auditory systems with the aid of focused ultrasound. Characteristics of distribution of sensitivity in the skin surface and in deep tissues are described and discussed. Specific features of sensitivity in biologically active points are considered. The studies showed the advisability of isolating elementary sensation and considering its role in formation of a sensory image. Artificial formation of samples, especially single-model samples such as tactile, temperature or auditory modes was found to be helpful in these studies since such a model can be controlled to a great degree by the researcher with the aid of focused ultrasound and other artificial stimuli. References 21; 20 Russian, 1 Western.

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CHANGE OF RNA AND PROTEIN LEVEL IN NEURONS-GLIA SYSTEM UNDER EFFECTS OF
HYPERTHERMIA AND HYPOXIA

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR. SERIYA BIOLOGICHESKIKH
I KHIMICHESKIKH NAUK in Russian No 5, Sep-Oct 85 (manuscript received 13 Feb 84)
pp 42-47

[Article by L. M. Mamalyga]

[Abstract] Functional and metabolic possibilities of different brain structures, under the effect of hyperthermia, hypoxia and combination of them, were studied by cytochemical and morphological methods in experiments performed on standard Wistar male white rats (weight 160-180 g) (age 5-6 months). Rats were subjected to simulated altitude of 8200 m, to hyperthermia at $40+0.5^{\circ}\text{C}$ for 75 minutes or to combined hyperthermia and hypoxia at 8200 m and 40°C for 75 minutes. After the experiments, rats were decapitated without use of anesthesia and RNA level and total and basic proteins in various neurons-glia systems were studied. Separate and combined effect of hyperthermia and hypoxia in the organism produced metabolic and morphological changes in the brain structures studied. Reduction of RNA level and proteins in the neurons under combined effect of hyperthermia and hypoxia decreased their cytoplasm volume; overheating dehydrated the organism, reduced the volume of circulating blood, increased its viscosity and reduced the hemoglobin level in the erythrocytes. This produces toxic substances in the organism, oxidation of which requires a considerable quantity of oxygen. The combined effect of hyperthermia and hypoxia, increasing at different rates, decreased the animals' resistance to altitude considerably. Data of the study and information in the literature agree on the undesirable effect of combined hypoxia and hyperthermia. Figures 2; references 12: 9 Russian, 3 Western.

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PUBLIC HEALTH

COMMENTS ON MEDICAL ETHICS

Tashkent PRAVDA VOSTOKA in Russian 28 Jan 86 p 4

[Article by M. Sadvakasov, "Pravda Vostoka" correspondent]

[Abstract] An appalling case of breakdown of medical ethics came to light when a physician, A. I. Tikhonova, refused to treat a cabdriver, N. A. Utkin, for osteochondrosis. The refusal to treat came after a medical commission ruled that Utkin was indeed sick after Tikhonova failed to make a proper diagnosis. One thing led to another with an increasing amount of bitterness, with an attempt by Tikhonova to suppress the publication of the story via her alleged 'connections'. Utkin, in turn, felt that he would have been treated if he had offered to pay. The case was further aggravated and complicated by assertion of the local medical board that Tikhonova had been dismissed, whereas she had actually resigned. To make a long and unpleasant story short, it is obvious that the matter would have turned entirely differently if greater sensitivity and rudimentary adherence to medical ethics had been shown by the medical personnel concerned.

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CSO: 1840/1085

PROBLEMS AT MOSCOW FIRST CITY HOSPITAL

Moscow MOSKOVSKAYA PRAVDA in Russian 15 Feb 86 p 2

[Article by E. Timofeyeva]

[Abstract] The First City Hospital in Moscow is the largest hospital in the country, its multitude of buildings occupying an area of two hectares. Many highly qualified specialists practice there and students train at a unique facility that has some 2,000 beds and offers a full spectrum of clinical problems. Unfortunately, management of the facility leaves something to be desired, as the hospital is understaffed in nurses and other medical personnel, overcrowded with patients, and short on rudimentary equipment and supplies such as wheelchairs. The physical layout also leaves a lot to be desired: lighting between buildings is sparse or lacking, directions between building and in corridors are lacking, rules about visitors and streetclothing are not enforced, dining facilities are lacking or inadequate, and the litany can continue seemingly ad infinitum. The director of the hospital, Andrey Ivanovich Lysov, offers the standard excuses and platitudes, and yet has taken steps to forbid the hospital staff to talk to journalists without his express permission. Meanwhile patients continue to die unattended in corridors, as was the case with patient B. who spent several days in a corridor without medical attention before succumbing from a myocardial infarct.

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CSO: 1840/1081

NOVEL HEALTH BANK CONCEPT

Leningrad LENINGRADSKAYA PRAVDA in Russian 2 Feb 86 p 3

[Article by S. Krayukhin, based on interview with Feliks Vladimirovich Ballyuzek, chief, Chair of Surgical Diseases, Sanitary-Hygiene Institute]

[Abstract] The current reorganization of the Soviet health care system, based as it is on mass medical screening, has led to many interesting developments, not the least interesting of which is the close cooperation between industrial enterprises and medical establishments. The Sanitary-Hygiene Institute has benefitted from such interaction in the form of novel and made-to-order instrumentation, and in turn has assisted the industrial enterprises with their health care needs and in conducting screening programs. The latter has resulted in health data banks that are useful in assessing working conditions, employment suitability, and in delineating rational health programs. Management of the health data banks would not be possible but for computer support, and the latter in turn introduces physicians to the intricacies of information storage and retrieval systems.

12172/12955
CSO: 1840/1075

INADEQUATE DENTAL SURGERY RESOURCES IN LITHUANIA

Moscow TRUD in Russian 5 Feb 86 p 2

[Article by V. Belitskiy]

[Abstract] The newspaper complains about the inactivity of responsible Union and Republic Ministries concerning resolution of inadequate resources in LitSSR for teeth implantation operations. D. Surov performs such techniques in Kaunas under less than adequate conditions: the laboratory is located in a tiny space, the budget is minuscule and even the operations must be performed in rental space at Kaunas Medical Institute. As a result, only 200 implantations can be performed annually. This is considered to be unacceptable from the public health point of view. Attempts by TRUD to intercede with the USSR Ministry of Health (A. Moskvichev, Chief of Main Directorate of Medical Prevention Service and Deputy USSR Minister of Health, A. Safonov) were fruitless. Nothing, apparently, was done except for some misinformation and bureaucratic stalling.

7813/12955
CSO: 1840/389

DEFECTIVE MEDICAL INSTRUMENTATION AND EQUIPMENT

Baku BAKINSKIY RABOCHIY in Russian 18 Feb 86 p 3

[Article by V. Musayev, section chief, Azerbaijan SSR Administration of All-Union State Standard]

[Abstract] A survey of the various clinics and hospitals in Baku has revealed a serious and potentially health-threatening problem due to defective medical measuring instruments and equipment. In short, the results of, for example, tonometry, are unreliable in some 50% of the cases under the best conditions, and the same or worse criteria apply to the other instruments. The same problem is evident even at the Scientific Research Institute of Clinical and Experimental Medicine imeni Academician M. A. Topchibashev, whose director is N. Rzayev. The directors of the various medical facilities involved are quite blasé about the entire matter, and are even willing to blame technicians charged with checking the accuracy of such instruments as being wrong. This state of affairs constitutes blatant violation of the regulations of the USSR Ministry of Health and demands immediate rectification, in order to insure an improvement in the delivery of medical care.

12172/12955
CSO: 1840/1083

DISEASE CONTROL PROGRAM

Moscow GOLOS RODINY in Russian No 3, Jan 86 p 6

[Article by GOLOS Rodiny correspondent Nikolay Korobochkin after interview of Sergey Petrovich Burenkov, USSR Minister of Health]

[Abstract] The USSR Health Minister summarizes current efforts to institute comprehensive health maintenance programs for the general Soviet population under the auspices of the USSR Ministry of Health and the USSR Academy of Medical Sciences. Some 50 other regional organizations participated in preparing the program. Results have already been accomplished, according to Minister Burenkov, since one third of physician's visits are for disease prevention; these visits involve 120 million people. Such preventive health care has not proceeded as well in the countryside, due to transportation difficulties in isolated, sparsely populated regions where aviation is required to deliver health care. Nevertheless, expenditures for rural health care have doubled its availability in the past 15 years. Modern electronic and mechanical equipment, atomic medicine and up-to-date optics are all being expanded rapidly. The number of clinic and hospital beds if being increased, but major emphasis is being placed on prophylactic procedures to prevent illness and lengthen the lives of all Soviet citizens.

12131/12955
CSO: 1840/335

ALCOHOL EFFECT ON HEART

Minsk SELSKAYA GAZETA in Russian 12 Dec 85 p 4

[Article by F. Grechko, physician, Minsk Municipal Home of Medical Education, honored physician BSSR]

[Abstract] F. Grechko describes and comments briefly on the progression of changes occurring in the heart as the result of use of alcohol. Functional changes (disturbances of heart rhythm, fast heart rate, unpleasant sensations in the region of the heart) are reversible; long-term use of alcohol causes irreversible changes in the heart muscle (it weakens and becomes flabby) and also in the blood vessel walls. The heart continues to function, but with decreasing efficiency and, eventually, cardiac insufficiency, (so-called alcohol cardiomyopathy) which greatly increases the risk of myocardial infarction. Grechko says beer drinking affects the heart as does use of hard liquor. He states that alcohol impairs the function of all parts of the cardiovascular system with the result that half of all alcoholics die before the age of 50 years and 18.5 percent of these die as a result of cardiac catastrophe.

2791/12955
CSO: 1840/334

DESIRABLE TRAINING FOR ASPIRING PHYSICIANS

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 7 Jan 86 p 3

[Article by K. Ormantayev, head of Chair of Children's Surgery, Alma-Ata Medical Institute]

[Abstract] K. Ormantayev lists and briefly discusses some weaknesses in selection, training and performance of physicians. On the basis of 20 years of experience at the Alma-Ata Medical Institute, he says improper professional training is the cause of most deficiencies found in practicing physicians. He reports that 20-30 percent of first-year medical students do not have an adequate awareness of the overall aspects of the medical profession. This results in drop-outs among first-year students and graduation of some inadequately prepared physicians. He urges more courses in scientific disciplines for prospective medical students and calls for provision of better and more modern equipment, especially in children's hospitals. He suggests some improvements in medical education and advanced training of physicians. He emphasizes the vital importance of improvement of training of medical personnel in order to increase the well-being and improve the conditions of life and work of the Soviet peoples.

2791/12955
CSO: 1840/331

UDC 616-057-084.3(47+57)

PERIODIC HEALTH EXAMINATIONS WITHIN CONTEXT OF SOVIET MASS SCREENING PROGRAM
[DISPENSARIZATION]

Moscow GIGIYENA TRUDA I PROFESSIONALNYYE ZABOLEVANIYA in Russian No 1,
Jan 86 (manuscript received) pp 3-7

[Article by A. M. Monayenkova, T. B. Popova, V. I. Zertsalova and L. N. Nikolayeva, Institute of Labor Hygiene and Occupational Diseases, USSR Academy of Medical Sciences, Moscow]

[Abstract] With the promulgation of mass screening as an inherent component of the Soviet preventive medicine system (June 1983 Plenum, CC CPSU), further analysis has shown that full effectiveness of the program can only be realized on the basis of periodic health examinations as a vital factor in the overall picture. As the fundamental data source for mass screening statistics, the periodic health examinations are divided into two stages, with stage I concerned with health risk assessment and disease detection. Stage II encompasses measures for long-term followup, prevention and treatment. A full and efficient utilization and management of the clinical data base requires computerized information retrieval systems. Such systems need further improvement to reflect the occupational environment and attendant risk factors to find full utility in industrial medicine.

12172/12955
CSO: 1840/374

EXCESSIVE PAPERWORK IN MEDICAL PRACTICE

Moscow IZVESTIYA in Russian 7 Feb 86 p 3

[Article by S. Tutorskaya]

[Abstract] The problem of formalism in medicine is highlighted, stressing the impersonal approach to patients, practice of paper rather than living medicine, creation of mountains of paperwork which occupies almost half of physician's time and which lead to no useful action. A proposal is made to provide physicians with special forms which could be easily filled out and designed for the particular problem at hand; supposedly shortage of paper was given by the authorities as the reason for the lack of such forms. Another problem raised by practicing physicians concerns requirements from various specialists and administrators for data demanding much of their time but often meaningless. These requirements kill more time available for interaction with patients. Multiple visits to clinics, limited quantities of prescribed drugs even for chronically ill patients waste the time of physicians and patients alike. One proposed remedy is to permit nurses to handle this requirement and assign more nurses to the clinics. An appeal is made for some action against this "syndrome of paper fever."

7813/12955
CSO: 1840/369

UDC 617.7:658.386.3

CURRENT STATUS AND IMPROVEMENTS IN POSTGRADUATE OPHTHALMOLOGICAL TRAINING
AT INSTITUTES AND FACULTIES OF ADVANCED TRAINING OF PHYSICIANS

Moscow VESTNIK OFTALMOLOGII in Russian Vol 101, No 5, Sep-Oct 85
(manuscript received 16 Apr 85) pp 65-69

[Article by Professors N. B. Shulpina and V. V. Shmeleva and Candidate of Medical Sciences V. A. Zhukov, Central Order of Lenin Institute for Advanced Training of Physicians]

[Abstract] A summary review is presented of the current status in post-graduate ophthalmological training in the RSFSR, and trends for future developments of such programs. The problems are analyzed in light of availability and accessibility of training programs and the demographic composition of ophthalmologists in the USSR. As of January 1, 1977, ophthalmologists accounted for 2.2% of the physician population in the Soviet Union; the latest statistics indicate that 86.7% of the ophthalmologists are women. The statistical analysis has also shown that only 17.1% of the ophthalmologists can be excluded from the requirements for advanced training in their specialty either due to age (retirement) or as recent graduates (less than 3 years of clinical practice). The drop in postgraduate training rate from 86.2% (cases/100 ophthalmologists) in the 1972-1976 period to 59.8% in the 1979-1983 period largely reflected failure of the training programs to keep up with the growing number of ophthalmologists. More coordinated efforts are required to suit the postgraduate training programs to the needs of qualified ophthalmologists, as well as to expand the available programs to encompass greater numbers of candidates. References 2 (Russian).

12172/12955
CSO: 1840/406

UDC 616-006.04-036.2-037

PREDICTION OF MALIGNANT NEOPLASM MORBIDITY

Moscow SOVETSKAYA MEDITSINA in Russian No 7, Jul 85 (manuscript received 11 Nov 84) pp 73-76

[Article by Professor Yu. Ya. Gritsman, I. N. Batinov, I. I. Shafir, M. I. Chaplyuk, Yu. N. Antipov-Antonov, V. K. Zaseyev and M. Yu. Lishak, Moscow Scientific Research Institute of Oncology]

[Abstract] Medical-statistical data for 1971-1980 are used to provide a cancer morbidity and mortality prediction. Primary attention is given to analysis of mathematical prediction methods. It is not yet possible to use a mathematical model of morbidity as the basis of the prediction, since the etiology and pathogenesis of malignant neoplasms are not yet clear. A phenomenological approach is therefore used, considering the nature of changes in medical-statistical data with time. The algorithms developed allow prediction of cancer morbidity with acceptable accuracy. Prediction algorithms have been developed considering the specifics of the statistical data. The results of predictions for a number of locations up to 1990 can be used in planning the development of oncological clinics and optimization of their structure. Figures 3; references 13: 10 Russian, 3 Western.

6508/12955
CSO: 1840/1055

UDC 615.471.03:616-084.3

SOME PROBLEMS OF UTILIZATION OF HARDWARE DURING ANNUAL PHYSICAL EXAMINATIONS
[DISPENSARIZATION]

Moscow SOVETSKAYA MEDITSINA in Russian No 7, Jul 85 (manuscript received
31 Oct 84) pp 68-69

[Article by L. M. Dubovyy and Yu. A. Laptev, Penza]

[Abstract] Due to the unavailability of diagnostic equipment in rural areas, the Penza Oblast Health Department has undertaken studies for the development of methods of rapid diagnosis to perform the task of examination by non-professional medical personnel, at minimum cost with maximum simplicity of hardware. The method of electropuncture diagnosis was selected, based on linear conversion of resistance values at 24 acupuncture points to establish the norm and pathology of 12 meridians. After the values are measured, the organs and systems which deviate from the individual physiological norm are determined. The rule of 5 elements is used to localize the pathology. Clinical testing has confirmed that the use of the instrument allows not only preliminary examination but also determination of the condition of patients at any moment in time with respect to any disease using the public health automated control system. References 3 (Russian).

6508/12955
CSO: 1940/1055

UDC 616-057-084.3

COMBINED APPROACH TO PROBLEM OF DISPENSARIZATION SERVICING OF FACTORY WORKERS

Moscow SOVETSKAYA MEDITSINA in Russian No 7, Jul 85 (manuscript received 12 Sep 84) pp 63-67

[Article by L. L. Kuznetsova and S. Ye. Kvasov, Department of Social Hygiene and Organization of Public Health, headed by Docent S. Ye. Kvasov, Gorkiy Medical Institute]

[Abstract] The main tasks of this study were to determine an approach to the problem of providing dispensarization services at an industrial enterprise, to create formalized documentation for collection of social-hygienic and clinical-physiological information, to formulate a data base from this information, to study the influence of certain ecological and occupational factors on the workers, to create an automated system for diagnosis of cerebral vascular disease during preventive examinations and to estimate the social-medical and economic effectiveness of its utilization. The materials of the study demonstrate that a combined approach to the problem of providing dispensarization services for factory workers utilizing automated systems can establish the regularities describing the influence of ecological, social-hygienic and production factors on the functional status of the body and the health of the workers to improve health by influencing all elements of the ecological system under conditions of industrial production.

References 13 (Russian).

6508/12955
CSO: 1840/1055

UDC 616.3+616.2]-084.3

INITIAL AUTOMATED SCREENING, FIRST STEP IN NATIONWIDE DISPENSARIZATION SERVICES TO POPULATION

Moscow SOVETSKAYA MEDITSINA in Russian No 7, Jul 85 (manuscript received 27 Nov 84) pp 59-63

[Article by M. P. Vilyanskiy, B. S. Kibrik, A. A. Chumakov, N. N. Uglev and Ye. O. Solovev, Yaroslavl Medical Institute]

[Abstract] The authors have developed a universal health-screening system for the entire population, suggested for implementation in several stages, including filling out of a questionnaire by all workers, processing of the data thus collected by computer, filling out of a more lengthy questionnaire by persons determined to be in risk groups, processing of these questionnaires by computer, resulting in determination of dispensary observation groups, and, finally, treatment of persons determined to be in need of treatment. The primary automated screening method is an effective means of performing massive preventive examinations in the population. Questionnaires to identify risk groups can be utilized in rural regions, regardless of distances and road conditions. The universal mass screening system will allow diagnosis of all types of lung pathology and upper GI diseases among large groups of the population in comparatively short times. This method of examination is more effective and economical than ordinary periodic examinations. References 5 (Russian).

6508/12955
CSO: 1840/1055

PSYCHOLOGY

AUTOSUGGESTION

Moscow TRUD in Russian 9 Jan 86 p 3

[Article by TRUD correspondent V. Velitskiy after interview of V. Ye. Rozhnov, professor, Department of Psychotherapy and Narcology, Central Institute for Advanced Training of Physicians]

[Abstract] Self conditioning [autogennaya trenirovka] is discussed as a method for psychological and physical well-being, including development of a positive self-image and enthusiasm for achieving and maintaining good health. The stress of modern life with its machinery and other factors that promote psychosomatic ailments can, according to Professor Rozhnov, be combatted by self conditioning. It can help deal with insomnia, sensitivity to noise, light and other irritations, and even alcohol abuse and smoking. He cautions that it is not a panacea, but only an aid to help healthy people to avoid some of these disorders and sick people to deal with them and their consequences. Related concepts of psychohygiene, psychoprophylaxis and physical training for health are also discussed. Methods of autosuggestion and self-hypnosis are included in the self conditioning program. The need for confidence in the potential for results is stressed, for those who doubt the effectiveness of the program will gain nothing from it. Many self-conditioning clinics have been established at plants around the Soviet Union; as early as 1974 in the mines of the Donbas area, successful programs were in place. Other programs have been and are being established at spas and sanatoria. The importance of supervision by a physician is stressed.

12131/12955
CSO: 1840/332

RADIATION BIOLOGY

ELECTROMAGNETIC RADIATION STANDARD

Moscow STANDARTY I KACHESTVO in Russian No 1, Jan 86 p 78

[Synopsis of article (in English) in source]

[Text] Industry Standard Specifying the Level of UHF Irradiation. B. M. Mirzoev. -- Standarty i kachestvo, 1986, No 1.

Comments are made to the industry standard OST 54 30013-83 LSSS. UHF Electromagnetic Radiation. Maximum Permissible Level of Irradiation. Safety Requirements. One diagram.

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CSO: 1840/348E

UDC 578.835.15:578.52].083.12:616.98:578.835.15]-078(478.9)

CHARACTERISTICS OF POLIO VIRUS TYPE 3 STRAIN GENOME ISOLATED IN MOLDAVIA
FROM POLIOMYELITIS PATIENTS

Moscow MOLEKULYARNAYA GENTIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian
No 9 Sep 85 (manuscript received 18 Mar 85) pp 27-32

[Article by G. Yu. Lipskaya, V. B. Seybil, L. P. Malyshkina, V. N. Gidirim,
S. G. Drozdov and V. I. Agol, Interdepartmental Scientific Problem Research
Laboratory of Molecular Biology and Bioorganic Chemistry imeni A. N.
Belozerskiy, Moscow State University; Institute of Poliomyelitis and Viral
Encephalitides, USSR Academy of Medical Sciences, Moscow]

[Abstract] In spite of great success of the preventive measures against polio, cases continue to show up in many countries. A number of paralytic polio cases was noted in Moldavia in 1982, caused by polio virus type 3. RNA from purified virus of these patients was hydrolyzed with T1 RNAase and the mixture of oligonucleotides obtained was electrophoretically purified. Oligonucleotides of various isolates were charted and the maps were compared among each other and to a known map of virus vaccine strain, type 3. It became evident that all of them were related to each other and differed from the vaccine strain of the polio virus type 3; evidently, a wild polio virus circulated in Moldavia at that time. A recommendation was made to use oligonucleotide mapping of RNA-containing viral genome in molecular epidemiology studies. Figures 2; references 17: 7 Russian, 10 Western.

7813/12955
CSO: 1840/316

CONFERENCES

PROTEIN RESEARCH DISCUSSED AT BIOCHEMISTRY CONGRESS

Kiev PRAVDA UKRAINY in Russian 28 Jan 86 p 3

[Excerpt] Kiev, January 27 -- The task of contemporary biochemistry is to place biologically active substances at the service of mankind. Problems, achievements and prospects of biochemistry are the topic of discussion at the Fifth All-Union Biochemistry Congress, which opened today in the capital of the Ukraine. Among the 1,700 participants in this congress are leading Soviet biochemists, biologists, physiologists, microbiologists, physicists, medical personnel, and representatives of other fields of learning. Guests from Bulgaria, the German Democratic Republic, Poland, Czechoslovakia and Yugoslavia are attending the congress.

The congress was opened by academician S. Ye. Severin, president of the USSR Academy of Sciences' All-Union Biochemistry Society.

A paper entitled "Proteins: Their Present and Future" was given at the first plenary meeting by Yu. A. Ovchinnikov, vice-president of the USSR Academy of Sciences.

FTD/SNAP
/12955
CSO: 1840/383

POLISH PHARMACOLOGISTS AT TURKMEN DRUG CONFERENCE

[Editorial Report] Ashkhabad SOVET TURKMENISTANY in Turkmen 15 November 1985 carries on page 4 a 200 word Turkmeninform dispatch reporting that "the conference on questions of the use of new medicinal preparations produced in the Peoples Republic of Poland in dermatology, pulmonology, psychiatry and neurology concluded its work in Ashkhabad on 13 November. The 150 participants, Turkmen specialists from research institutes and medical clinics, were addressed by the Polish scholars A. Novak, Dr. Med. Sci., and M. Szmidt, Dr. Med. Sci."

/12955
CSO: 1840/382

UDC 006.3

CONFERENCE ON NEUROSCIENCES, BAKURIANI, 4-9 MARCH 1985

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR in Russian Vol 81, No 11, Nov 85
(manuscript received 5 May 85) pp 1467-1472

[Article by N. F. Suvorov]

[Abstract] The second conference on the neurosciences, dedicated to the 100th anniversary of the birth of I. S. Beritashvili, was held in Bakuriani on 4-9 March 1985, sponsored by Tbilisi State University and the Georgian Physiological Society imeni I. S. Beritashvili. The subjects discussed at the conference included the quantitative characteristics of transmembrane calcium ion fluxes upon excitation of nerve cells, identification of channel proteins in a noncellular system, neurophysiological, neurochemical and physiological analysis of the functions of isolated nerve cells, the problem of sleep and waking, innervation of the retina in vertebrates, various approaches to development of studies of the operation of the human brain, including clinical, psychological and immunological approaches.

6508/12955
CSO: 1840/1046

SOVIET-FINNISH SYMPOSIUM "BIOGAZ-85"

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA in Russian
No 1, Jan-Feb 86 pp 155-157

[Article by S. Kh. Tapaltsyan and G. A. Starovoytova]

[Abstract] Title symposium was held 4-6 February 1985 in Moscow's Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences; it was organized by the USSR State Committee on Science and Technology; State University imeni Lomonosov; Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences and the Finnish Company "Enbom." In his opening remarks, I. V. Berezin stressed the importance of the "biogaz" problem in the fields of energy, food and ecology. Director of "Enbom" reviewed the history of his company and discussed their activities in the area of environmental protection and new energy sources. Potential for development of biofuel industry in the USSR was discussed by Ye. S. Pantskhava, who concentrated on organic waste as the source of biogas. Professor Rayomo Myayatti (Helsinki) followed by citing Finnish experience in the same area. Mechanism of the formation of biogas was discussed by Pyayvi Latola; L. I. Mangayt discussed the technology of biogas production from urban sewage. Olavi Akhti noted that one of the best sources for biogas can be found in agricultural projects, especially on animal breeding farms. E. G. Afrikyan addressed climatic characteristics which may affect utilization of wastes. M. Ye. Beker concentrated on anaerobic bioconversion processes for agricultural wastes. A. A. Chichkin speculated on the possibility of forming complex energy farms to provide energy for transportation. Economic aspects and mathematical modeling were the topics covered by A. Kh. Azizov, who is a consultant to the President of the USSR Academy of Sciences.

7813/12955
CSO: 1840/378

MISCELLANEOUS

HUNGARY LICENSED TO MANUFACTURE SOVIET MEDICAL INSTRUMENTS

Moscow ECOTASS in English No 4, 27 Jan 86 p 11

[Text] According to the foreign trade association "LICENSINTORG", it handed the Hungarian association "MEDICOR" design and production specifications on rheographs, medical instruments, to be manufactured under Soviet license in Hungary.

Rheography is one of methods used for early diagnosis of cardiovascular diseases. However, its wide-scale application is hampered by the rheograph's sophistication and low rates of stability in the results of examination.

A new rheograph designed at the 1st Moscow Medical Institute simplified the adjustment stage and the process of examination itself.

In contrast to earlier-manufactured instruments, the new rheograph features six measuring channels and an indicator panel for monitoring the channels' operation.

Soviet specialists will help in starting the production.

/12955
CSO: 1840/439E

LABORATORY FOR RADIOPHYSICAL STUDIES OF BIOLOGICAL OBJECTS

Moscow IZVESTIYA in Russian 29 Dec 85 p 3

[Article by B. Konovalov, Izvestiya science commentator]

[Abstract] The article reports on the work of a special laboratory for radio-electronic methods of studying biological objects, which has been created at the USSR Academy of Sciences' Institute of Radio Engineering and Electronics (IRE). This research direction was initiated by Academician Yu. V. Gulyayev. The head of the laboratory is Doctor of Physical-Mathematical Sciences E. E. Godik. Research reportedly is being done in seven areas: electrical fields, magnetic fields, radiothermal radiation of internal organs, infrared radiation from the surface of the body, optical chemiluminescence of humans, acoustic signals, and chemical composition of the environment directly surrounding humans.

The author of the article visited the laboratory, which occupies the first floor of an old building in the center of Moscow. Godik first showed him a cage-like structure in which an electromagnetic system compensates for the effect of the Earth's magnetic field, so that magnetic fields emanating from humans can be recorded. Godik explained that non-contact magnetograms can provide more valuable information than electrocardiograms, for example. The physicists reportedly are working on this in collaboration with the All-Union Cardiology Center. The laboratory also has a chamber which screens out external radio emissions. In this chamber, a radiometer can record heat emission from deep within the body and measure internal body temperatures in seconds. It is said to be also possible to record detailed information in the superhigh-frequency radio range, so that the distribution of temperatures throughout the body can be determined.

The laboratory has a chamber with highly sensitive electrical-field sensors. They can, for example, record the 'seismicity' of the rib cage when one breathes. Heartbeat also affects the rib cage, and in this chamber it is possible to record cardiograms by non-contact methods. The sensors also can record the movement of muscles, which is said to open up possibilities for remote monitoring of the emotional state of humans.

Another facility is a darkroom in which chemiluminescence of the human body is recorded. Its instruments are capable of recording individual photons.

The intensity and distribution of luminescence along the body are said to depend on its condition, and this can serve as a diagnostic tool for detecting tumors and determining the degree of burns, for example. The laboratory also has laser instruments for measuring chemical compounds in the air directly surrounding the body in amounts as small as 10 molecules per cubic centimeter.

The laboratory has developed an infrared television process which is likened to time-lapse photography. It is claimed that for the first time in the world, dynamic processes occurring in the cerebral cortex of animals have been made visible in real time, without opening the skull. Studies have been made of how these processes are affected by various types of stimuli: visual, auditory, and drugs. These studies are being done with scientists of the USSR Academy of Sciences' Institute of Higher Nervous Activity and Neuro-physiology.

It is noted that most of the laboratory's associates are recent graduates of the Moscow Physical-Technical Institute. Work reportedly is under way on creating a research chamber in which all the different technologies can be combined in unique isolation from the external environment.

FTD/SNAP
/12955
CSO: 1840/382

UDC 615.471.03:612.821.1/.3-08

PORTABLE, PROGRAMMED BATTERY-RUN CHRONOREFLEXOMETER

Moscow GIGIYENA TRUDA I PROFESSIONALNYYE ZABOLEVANIYA in Russian No 12, Dec 85 (manuscript received 3 May 84) pp 54-56

[Article by Yu. M. Bagdinov, All-Union Scientific Research Institute of National Pipeline Construction, Moscow]

[Abstract] Improvements have been made in a portable chronoreflexometer designed in 1976 to make it a more flexible system for on-site evaluation of human sensorimotor reactions [Bagdinov, Yu. M., et al., Gig. Truda, No 4: 54-55, 1977]. The key features of the new model are the fact that it operates on a 12 V battery, weighs less, and is smaller in size. In field trials the apparatus worked efficiently over a temperature range of 0 to 40°C with a relative humidity of 80%. Separate measurements can be made of the latency periods and motor component of a response, allowable errors can be regulated, and control is provided over light (green, yellow, or red) and auditory (500 and 1000 Hz, 30-70 dB) stimuli. Figures 1; references 1 (Russian).

12172/12955
CSO: 1840/373

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